Can telecentres successfully empower communities? Planning, Design, Execution and Evaluation of a South African Rural-agricultural Telecentre

by

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submitted in fulfillment of the requirements for the degree

Philosophiae Doctor

2016

PREFACE

The author wishes to acknowledge the University of Pretoria: Prof. Stephanie Burton, Vice-Rector of Humanities, for her continuous encouragement, advice and support without whom this study would never have been completed, as well as my study-leader, Prof. Martin Breitenbach from the School of Economics, for his most appreciated guidance and patience and from whom I have gained so much professional insight and knowledge in the course of finalizing the thesis.

The author wishes to express her sincere appreciation and gratitude to the following persons for their contributions:

The Management Committee of the Thabina Water User Association as well as each and every farmer for his/her valuable time and insights which they shared with me during the execution of this study at their irrigation scheme. Their friendliness, assistance and hospitality that I experienced will always be cherished – not only did they share with her their most inner concerns and opinions – not only their aspirations, anticipations and expectations, but also their fears and needs on various aspects. This led to long term friendships being maintained and cherished to this day;

Linda Vos for so thoroughly and conscientiously editing the thesis;

My children for their much appreciated and consistent encouragement, love and moral support throughout the execution of the study;

My dearest friends as my support system, encouragers and inspiration during the completion of the thesis.

ABSTRACT

Participatory Monitoring and Evaluation of the telecentre at the first rural poor small-scale water user association in South Africa

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This thesis is an in-depth micro study that adapts the participatory monitoring and evaluation (PM&E) method to study the planning, establishment and post-establishment phases of a telecentre in a deep rural-agricultural setting in South Africa. The PM&E Method forms part of the humanistic, person-centered approach of the Ethnographic Paradigm which promotes the research participants as the central characters in their own development process since their opinions, suggestions and recommendations are collaboratively discussed and included in all Actions undertaken.

Thabina was chosen for this study, for two reasons: Firstly, being the first small-scale Irrigation Scheme in South Africa to be transferred into a water user association (WUA) by the then Department of Water Affairs and Forestry (DWAF), it provides the researcher with a local community that is already organized into an homogenous unit and second, the fact that the community is geographically located in a deep rural agricultural area of South Africa. The community is therefore a developing community at a low level of development, which may according to the literature, benefit from development communication and information. For example, the farmers have to comply with the rules and regulations of the Department of Water Affairs, which could be easily adhered to if the financial and management systems were computerized. The farmers also have to communicate with other stakeholders, role-players and agriculture-related organizations.

The participatory approach, which forms part of the ethnographic discipline, as used in this study, was based on a four phase participatory process. In this thesis a generic four-phase participatory process is developed by extracting from existing models in the literature the ingredients that would best fit the circumstances of this case study. The complete model framework would have to take into account the institutional structure of a telecentre as well as that of a WUA, a Trust, a Cooperative, a Community Development Programme and many similar organizations, being established by means of the participatory paradigm. This generic four-phase participatory process (structure and actions) was then adapted to the specific circumstances, conditions and situation of the (mostly) illiterate farmers of the Thabina small-scale irrigation scheme. During these four consecutive, participatory phases of the four-phase participatory process, the community (farmers) participated in the decision making

processes and all comments and suggestions of the farmers were taken into consideration before any decisions were finalized by the Management Committee. At the completion of each phase the actions taken during that phase were evaluated by means of formative PM&E in collaboration with the Management Committee. This interpretative research method was chosen as the researcher could operate as a participant observer to the interactions between the farmers. This means that the research process will be presented as a narrative description – it will be presented as a "chronological rendering", as suggested by theorists for the Ethnographic Paradigm in which this participatory approach is classified.

A telecentre *per se* is a room or office with appropriate information and communication technologies (ICT) by means of which applicable information could be obtained, assessed, accessed, created and managed and communication established in order to address the socio-economic development needs of the community. The potential role of the telecentre in bridging the Digital Divide has been proven without doubt, as the telecentre, based on technologies, supports development. This means that technologies have put information and communication at the forefront of development.

This thesis may be viewed by some observers as a comprehensive experiment. During the pre-establishment phase, pre-establishment actions were taken to ensure that the design of the phases made provision for participation of the community during each and every step of the process. Before the evaluation of the actual implementation of the telecentre, several pre-establishment actions were undertaken, such as the determination of agriculture-related needs. The concept of a telecentre was also explained to the farmers during which the farmers decided that they needed a telecentre at their irrigation scheme. Draft documents compiled by the researcher, such as the Project Plan and how to manage a telecentre, needed to be approved by the community through the Management Committee, on which they were represented. In order to identify the socio-economic information and communication needs of the farmers, a survey of the socio-economic and ICT needs of the community was undertaken during semi-structured interviews. The valuable empirical data obtained from these questionnaires were evaluated and lead to the identification as well as buying of appropriate technologies to address the agriculture-related needs as well as the socio-economic and ICT needs. At the end of 2006, a year after the establishment of the telecentre in 2005, the use of the information and communication technologies was evaluated according to a theoretical model designed by the researcher in order to measure the use of the information and communication technologies. Empirical information showed that the expected daily use of the information and communication technologies exceeded expectations.

Irrespective of the harsh environment in which the telecentre had to operate (as discussed in Appendix A), the telecentre addressed the socio-economic needs and ICT needs as well as the agriculture-related needs of the farmers.

An innumerable number of studies have evaluated the role of telecentres in development; some studies have focused on rural telecentres and some studies have even used the PM&E method to evaluate telecentres. However, this study is the first of its kind to do a complete experiment of a deep rural-agricultural telecentre in South Africa and evaluating the whole process. To start with, besides being a participatory process from the word start, it is needs driven. This study then encompasses the planning, design, execution and post-execution – each step carefully executed and analysed with the PM&E method that was tailored to the case study. This thesis is therefore contributing to the literature on telecentres for development and the role of development information and communication in a deep-rural South African setting along with the lessons learnt from the planning, design, execution and stepwise PM&E from the planning stage through to the post-establishment phase. Never before has such a comprehensive experiment ever been completed for a rural-agricultural telecentre in South Africa. Therefore all scholars interested in the role of a telecentre and therefore development information and communication stand to gain from the insights of this study.

This study also contributes valuable information to support policies by government for sustainable growth in rural development; addresses the recently announced Presidential Imperatives; and focuses on the South African Department of Agriculture, Forestry and Fisheries' (DAFF) (DAFF, 2011) mandate of poverty alleviation.

FREELY TRANSLATED TERMS

1. Information and communication technologies – Inligtings- en kommunikasie tegnologieë;
2. Telecentre – telesentrum;
3. Development Support Communication – Ontwikkelings-ondersteuningskommunikasie;
4. Presidential Imperatives of rural development (Job Creation; Regional Integration; Skills Training; and Human Resource Development) – Presidensiële Prioriteite rakende landelike ontwikkeling (Werkskepping; Streeksintegrasie; Vaardigheidsopleiding; en Menslike Hulpbron-ontwikkeling);
5. Participative Monitoring and Evaluation – Deelnemende Monitering en Evaluasie;
6. Information Super-highway – Inligtingshoofweg;
7. Poverty alleviation – Armoede-verligting;
8. Digital Divide – Digitale verdeling;
9. Peace-meal intervention – Stuk-stuk ingryping;
10. Universal – internasionale.

ACRONYMS

AISI	African Inf
ARC	Agricultura
ARC-IAE	ARC-Institute for Agricultural Engineering
CTO	Commonwealth Telecommunications Organisation
DC	Department of Agriculture
DELTA	Department of Water Affairs & Forestry
DGF	Development Communication
DoA	Development Gateway Foundation
DOTF	Development Leadership Teams in Action
DSC	Development Support Communications
DWAF	Digital Opportunities Task Force
FAO	Food & Agricultural Organisation
GBDA	Geographical Information Services
GCIS	Global Business Dialogue on Electronic Commerce
GII	Global Information Infrastructure Commission
GIIC	Global Information Structure
GIS	Global Positioning Systems
GPS	Government Communications & Information System
HSRC	Human Sciences Research Council
i4d	Info for Development
ICT	Information and Communication Technologies
ISAD	Information Society and Development
ISRDP	Integrated Sustainable Rural Development Programme
ITU	International Communication Union
LDA	Limpopo Department of Agriculture
LPRA	Limpopo Provincial Road Agency
MDG	Marketing Surveys and Statistical Analyses
MPCC	Millennium Development Goals
MSSA	Multi Purpose Community Centres
NASPERS	Nasionale Pers
NGO	National Information Infrastructure
NII	National Water Act
NPFA	Needs, Problems, Fears & Aspirations
NWA	Non-Governmental Organisation
OAU	Organisation of African Unity
PA	Participatory Action Research
PAR	Participatory Research
PIT	Public Address System
PR	Public Internet Terminals
SAAU	South African Agricultural Union
SACS	South African Communication Services
SAFEX	South African Futures Exchange
SPSS	Statistical Product and Service Solutions
UK	Under-Serv
UN ICT TF	United Kingdom

LIST OF TABLES

LIST OF PHOTOS

LIST OF BOXES

LIST OF FIGURES

CONTENTS

	at the telecentre to translate the messages from the information and communication technologies into their own indigenous languages?	
9.6.5	What are the roles of the infostructure and infrastructure and access to such a sustainable telecentre at a small-scale irrigation scheme in the Limpopo province in South Africa? The infrastructure will be new to the research participants – will they be confident to engage in such a new venture? Could the infostructure be applicable to the research participants – will they understand the messages and will they need a manager at the telecentre to translate the messages from the information and communication technologies into their own indigenous languages?	480
9.6.6	Which information and communication technologies could be identified and acquired for a telecentre at a small-scale irrigation scheme in the Giyane district in the Limpopo province in South Africa? Could suitable and applicable information and communication technologies be identified which could enable constructive communication systems to the farmers at an irrigation scheme?	480
9.6.7	How can the members of the small-scale irrigation community of Thabina be transformed from recipients of technological know-how to providers of technological know-how? Could the research participants learn to manage and operate the information and communication technologies to the extent where they could become not only	480

CHAPTER 1 – INTRODUCTION TO AND BACKGROUND OF THE STUDY

The information revolution

"The 21st century has been defined as the "information era", basically because information is used to gain knowledge, which is the major source of advancement in society. This information is not only important for businesses, learning institutions and research centres but it has become vital for the development of communities.

Badimo (2005) Instituto del Tercer Mundo

1.1 INTRODUCTION

The constraints and limitations of existing information structures on developing communities (Naidoo, 2007) and their interaction with information and communication technologies are little understood in relation to social and economic development (O'Farrel *et al,* 2006). Without access to communication infrastructures and info-structures such as the information and communication technologies, it has always been difficult for these developing peoples to communicate with other communities and countries. Factors such as distance, time, and language are major restrictions to information and communication according to Obijiofor (2010). According to Obijiofor (2010), this inequality in access to information and communication technology has a direct link to underdevelopment and poverty.

Developing communities realise that without appropriate knowledge, they will always be dependent on other communities or countries to make a living, as this lack of information, and the consequent lack of knowledge, has led to these peoples remaining in poverty. Benjamin (2006) noted that developing countries such as Africa and her peoples can only overcome the restraints of despondency, dependency and poverty if they connect to, join in and take full advantage of information and communication technology.

In their need to escape their circumstances, these developing communities realise that information and communication technologies can provide accelerated support to their development and independence. In the context of this study, the information and communication technologies that were implemented, enabling communication supporting development for the farmers with markets, cooperations and agriculture-related organisations as well as role-players such as the various government Departments, are the computer, the telephone, Public Address system and the multifunctional printer. Adding

attributes of the information and communication technologies is Ekeanyanwu (2005:54) who adds that these information and communication technologies could become "key enablers of the agri-food sector by making dynamic and real-time global level exchange of data, information and knowledge quick, interactive and easy throughout the agricultural value chain". Researchers, theorists and academics (Feuerstein, 1986; McCarthy, 2006; Roman and Colle, 2006; Colle & Roman, 2010; World Bank, 2012; FAO, 2013) are of the opinion that a strategic solution to introduce information and communication technologies to the developing communities, is by means of a telecentre, which is based on, and therefore provides, the information and communication technologies to the rural community in order to enable the farmers to communicate by obtaining, assessing, accessing and managing much needed information for their development.

It is therefore the intension of this study, undertaken according to the humanistic, person-centered approach of the Ethnographic Paradigm, to develop a participatory model to deal with the establishment and research of the proposed telecentre at Thabina, by means of the participatory monitoring and evaluation method (PM&E). According to the PM&E method (explained in Chapter 4) the research participants play a pivotal role in their own development process since their opinions, suggestions and recommendations are collaboratively discussed and included in all actions undertaken.

Research objectives of the study, aiming at enabling communication that could lead development and empowerment of the farmers, are undertaken according to the humanistic characteristics – the interpretation and the participatory traditions. These research objectives are discussed and explained in Section 1 and can be summarised in short as follows:

Primary objectives

- The central research objective was to research, plan, design, execute and evaluate a complete experiment of establishing a rural-agricultural telecentre.
- A second objective was to establish the socio-economic and agricultural needs of this rural-agricultural community and apply these to develop the information and communication needs of the community at stake, using scientific methods to analyse and evaluate the telecentre.

Secondary objectives

- Development of an appropriate model for the planning, execution and evaluation of a rural agricultural telecentre;
- Implementing and evaluating a participatory, bottom-up approach for suitability of a theoretical departure point for the investigation and evaluation of a model for the

establishment of a sustainable telecentre in a small-scale irrigation scheme in the Limpopo Province in South Africa;

- Implementing and evaluating the roles of infostructure and infrastructure and access to such a telecentre at a small-scale irrigation scheme in the Giyane district of the Limpopo Province in South Africa;
- Identifying which information and communication technologies should b acquired for a telecentre at a small-scale irrigation scheme in the Giyane district in the Limpopo Province in South Africa;
- Exploring how can the members of the small-scale irrigation community of Thabina be transformed from recipients of technological know-how to optimal users of technological know-how:
    - What is the importance of setting up guidelines for the running of a telecentre?;
    - Would the Manager be able to translate the messages from the information and communication technologies into the indigenous languages of the peoples; and
    - Would the Manager assist to train the community members in the use and operation of the information and communication technologies?

- What evaluation measures are appropriate for evaluating a rural, agricultural telecentre, established by means of the model?

In order to accomplish these research objectives, a model for the planning and execution of the establishment as well as for the monitoring and evaluating of the establishment of a rural-agricultural telecentre - from the Pre-establishment Phase through the Establishment Phase - was developed.

This telecentre, situated at the Thabina irrigation scheme in South Africa, serves as a support structure at the irrigation scheme and empowers the Thabina community by means of enabling communication with the Department of Water and Sanitation, referred to in this study as the Department of Water Affairs (the then DWA), Northern Province Department of Agriculture, Land and Environment (NPDALE), other Provincial and National Departments, co-ops and agriculture-related organisations. Consequently the Thabina community is not only enabled to communicate internally and externally, but also to obtain, access, assess, manage and disseminate much needed and valued information to address their agriculture-related information needs as well as their socio-economic and ICT needs by means of the information and communication technologies introduced at the telecentre.

In addition to these objectives, the newly launched National Water Act (NWA) (Act No. 36 of 1998) of the DWA also added certain requirements for irrigation schemes which are adhered to by the Thabina telecentre by means of the information and communication technologies. This study then also contributes innovatively by addressing the rules and instructions regarding the establishment of support structures in order to enable farmers to submit annual and monthly reports to the DWA regarding their water use and water management.

Consequently the establishment and evaluation of the Thabina telecentre using and applying the PM&E method entails pioneering and ground-breaking research, by means of integrating the explored and examined research of various theorists, academics and researchers with the practical and real-life situation of a rural, small-scale irrigating community at Thabina: Thabina was not only the first small-scale irrigation scheme in South Africa, identified by the DWA to be converted into a water user association (WUA) but the Thabina telecentre was subsequently the first telecentre situated in a rural, small-scale irrigation sector of South Africa, who's establishment and evaluation formed the core of this study.

This Section 1.1 presents an introduction to the study – the setting and background of what could be expected from the study. Section 1.2 discusses the Empowerment by means of information and communication technologies with Sub-sections 1.2.1 on Research regarding small-scale irrigation schemes in South Africa; 1.2.2 regarding Background to the telecentre at the Thabina irrigation scheme; and 1.2.3 a brief synopsis of the background of the study. Section 1.3 explains the research objectives with the following Sub-sections: 1.3.1 with a discussion on the research objectives; and 1.3.2 an explanation of the value regarding the Agricultural Research Council (ARC). Section 1.4 offers Demarcation of research, followed by Section 1.5 that gives an Overview of research design and methodology. Section 1.6 explains the Definition of terms with the following Sub-sections: 1.6.1 on the various Connotations compared to the South African context; 1.6.2 on Development; 1.6.3 with Development Support Communication (DSC); 1.6.4 regarding Information provision; 1.6.5 concerning information and communication technologies; 1.6.6 about the Internet; 1.6.7 on technophobia; and 1.6.8 regarding the telecentre. Section 1.7 follows with an Overview of research design and methodology and Section 1.7 explains the structure of the study. Section 1.8 presents the Summary of the Chapter.

Since the telecentre is based on information and communication technologies (ICT), ICT will be explained in the following Section.

1.2 EMPOWERMENT BY MEANS OF INFORMATION AND COMMUNICATION TECHNOLOGIES

The implication and consequence of connecting to and joining in the information and communication technologies network are that the people in developing countries, as well as developing communities are rapidly merging global communication networks and international trade, according to O'Farrel *et al.* (2006). Despite this, there is a lack of empirical evidence or analysis of the actual experiences and effects of information and communication technologies on rural people's empowerment leading to social and economic development.

The telecentre provides the physical environment in the form of information and communication technologies (Infrastructure) as well as the management, access, assessment and creation of information infrastructure (infostructure) by means of these information and communication technologies. This study also contributes to the understanding and evaluation of the 2010 Presidential Imperatives of Rural Development, as announced in the State of the Nation Speech (GCIS, 2010), regarding the possible impact of rural information and communication technologies (infrastructure as well as infostructure: telecentre) on Job Creation; Regional (rural) Integration (integration of three entities namely the DWA, Department of Agriculture and the local community); Skills Training; and Human Resource Development. This study then also focuses on the South African Department of Water Affairs' (DWA) mandate of poverty alleviation as explained later in this thesis.

Naidoo, the then Chairman of the Development Bank of Southern Africa (2007) refers to Africa as the continent with the highest density of countries classified as rural, or LDCs, in 2007. Naidoo (2007) notes the importance of creating the continent's information infrastructure as most important due to the extent and importance of the continent's development needs. According to Naidoo (2007) only such infrastructure can lead to Africa bridging the digital divide. "With the vast majority of Africa's population living in rural areas, bridging the digital divide is an imperative" (2007:25). As a matter of fact, the uniqueness of the agricultural, irrigation sector in South Africa speaks for itself as it involves only 4% of the rural population (Van Averbeke, 2006). The remark from Schech (2002:14) that "technologies may offer unexpected opportunities that groups at the margin could seize to construct innovative visions and practices" is a welcome response to many a researcher in the information as well as the agricultural spheres.

Before stating the research objectives, it is vital to understand the contexts and problems of the rural agricultural area and the reasons for selecting it for this study. What follows next is an outline of small-scale irrigation schemes in South Africa, with specific reference to the small-scale irrigation scheme at Thabina, which was selected for this study. This section and the subsequent sub-sections serve the purpose of also providing the backdrop to the research problem.

1.2.1 Research regarding support structures and challenges at small-scale irrigation schemes in South Africa

Many small-scale irrigation schemes in South Africa as well as all over Africa have been researched, and surely those in the South African Giyane district showed some unusual characteristics such as the following, identified by Stimie *et al.,* (2001) in their comprehensive study for the International Water Management Commission (IWMI):

- The former political dispensation in South Africa divided South Africa into various homelands for the different indigenous nations. Small-scale irrigation schemes in these homelands had limited economic and natural resources, and were mostly successful until 1994, albeit mainly due to the much needed financial support from the former government. Stimie *et al.,* (2001) conclude that the way in which rural communities were managed by government, made these farmers totally dependant on government funding for infrastructure and other community development initiatives. Agricultural cooperatives were created by the former government in order to give effect to this policy. The manner in which these cooperatives were organised had the effect that the communities became labourers on these irrigation schemes without any participation in the maintenance, management and development of these irrigation schemes.
- With the withdrawal of financial aid in the form of budgetary support and management assistance by government to these cooperatives in the Giyane district in 1994, these small-scale irrigation schemes became dilapidated. According to Stimie *et al.,* (2001), when this budgetary support was withdrawn, every single irrigation scheme in this district became dilapidated and stopped functioning. Since 1994 efforts were made by the different Government Departments like the Provincial Department of Agriculture, the Department of Agriculture, Forestry and Fisheries (DAFF, 1998) and Department of Water Affairs (DWA) to revitalise these dilapidated small-scale irrigation schemes, without much success. The outcome of this process entails the desperate position of these small-scale irrigation schemes which find themselves still dependant on government for financial, technical and management support. This situation is due to the lack of government's financial support (Lahiff, 2000; Shah *et al.,* 2002). Since South Africa has a more modern constitution compared to other developing countries, the human rights principle has been emphasised much stronger in South Africa. This aggravates dependency on government, because farmers at the irrigation schemes believe that they have the right to financial and other assistance from government.
- This situation is aggravated due to the farmer's lack of knowledge of how to operate and manage these irrigation systems,

- South Africa is a water scarce country with scarcity of natural resources (Perret *et al*., 2003).
- The South African situation is harsh in comparison to most of the small-scale irrigation schemes worldwide (Van Averbeke, 2006), where international small-scale irrigation schemes are funded by government, NGO's or large private companies.

Queries from researchers at small-scale irrigation schemes including the Thabina WUA (explained in Appendix A), New Forest irrigation scheme and Tswelopele irrigation scheme in the Limpopo Province as well as Oppermansgronde WUA in the Free State Province, are summarised as follows:

- "Although the 'revitalization' of these schemes has been greeted with optimism and renewed hope in certain circles within government, non-governmental organizations (NGOs), the private sector and small-scale irrigation schemes, progress has so far fallen short of expectations in many of the schemes" according to Barbara Tapela (2005:45), of PLAAS, University of Western Cape.
- "Rehabilitating the irrigation infrastructure, providing effective extension services and facilitating access to information are public interventions that will undoubtedly be of benefit to smallholders …" (Van Averbeke, 2006:56).

Serious warnings have been raised by several researchers of developmental projects in Africa and specifically the Limpopo Province of South Africa. Charles Crosby *et al.* (2000), world-renowned researchers in irrigation scheme development, reviewed the prospects of small-scale irrigation in the Limpopo Province. They explain that "it is unbelievable that with the exception of sugar projects, there are virtually no schemes that have been successful ... (and) … the patterns of failure are so similar that it is not really necessary to undertake a needs analysis for individual projects." Crosby *et al*. (2000) continue that the overall micro-economic dynamics are piecemeal interventions. A telecentre established at a small-scale irrigation scheme, as a piecemeal intervention, will, most likely, fail to secure the sustainable success of such a scheme, if the eight pillars as identified by Backeberg and extensively explained in the WRC Report (TT 308/07) by Jonathan Denison and Siyabu Manona (2007), needed for a sustainable irrigation scheme, are not effectively addressed. In the case of Thabina both the Northern Province Department of Agriculture, Land and Environment (NPDALE) and the DWA (the two main government departments involved) addressed only three of these eight pillars, namely an Institutional Structure, indigenous systems and knowledge and partly natural resources, which lead to the near downfall of the Thabina irrigation scheme. Support structures had to be implemented, as these irrigation schemes are on the 'have-not' technology-and-information-side of the digital divide which divides the

'haves' of information technologies from the 'have-nots' of information technology (Schiller, 1996; Schech, 2002) by means of which information could be obtained, assessed, accessed and managed (Heeks, 1995; Van Audenhove, 2001).

The telecentre, as an intervention, supports isolated communities (such as these small-scale irrigation schemes) in bridging this digital divide, according to Castells (1985), Benjamin (2001) and Colle (2006). World-wide telecentres are seen as a room or office with information and communication technologies. In the South African context, the small-scale telecentre has information and communication technologies which are not only applicable, but also only those information and communication technologies which are affordable by the farmers. The optimal situation would be for the farmers to be able to access, assess, obtain, manage and disseminate as well as create relevant information, in order to address the agriculture-related needs as well as the socio-economic (Lahiff, 2000; Shah *et al*., 2002) and ICT needs of the community. Information and communication technologies in telecentres vary from only basic telephony to Internet connectivity (Ernberg, 1999) which means that some telecentres could in some cases provide only the telephone as a telephone shop, as explained by the IDRC (2007b) some may have other information and communication technologies such as a copier and there could be other situations where telecentres could comprise information and communication technologies such as a computer with or without Internet connectivity. In order to support socio-economic development of the farming community, the socio-economic (Lahiff, 2000; Shah *et al*., 2002) and ICT needs as well as the agriculture-related needs of the community should be researched and addressed by means of appropriate information and communication, created by the telecentre. When a telecentre enables effective and useful information and communication in order to comply with these requirements, it can be regarded as satisfying the objective. Sustainability of a telecentre at such a rural irrigation scheme for subsistence farmers and newly established WUAs in South Africa, cannot be judged by financial aspects alone, but should take into consideration various sustainability aspects such as social and cultural sustainability; political sustainability and technological sustainability, as described and recommended by various researchers and theorists (Berg, 1998; Kirsten & Van Zyl, 1998; De Vos *et al.,* 2001; Greenidge, 2004:2; Heeks, 2004:3; USAID, 2004; Van Averbeke, 2006; Schenk & Grobler, 2009).

This Section gave a bird's eye view of the research undertaken at small-scale irrigation schemes in South Africa, with reference to the Thabina irrigation scheme in the Giyane district. It also served the purpose of providing partly the backdrop to the research objectives of the study. This discussion now narrows down to an explanation of the Thabina telecentre,

serving to provide further background to the area chosen for this study and the reasons for doing so.

1.2.2 Background to the telecentre at the Thabina irrigation scheme

Thabina was the first small-scale irrigation scheme in South Africa which was identified to be converted to a WUA, by the then Minister of Water Affairs and Forestry. Established in 2005, the telecentre at the Thabina irrigation scheme is the first agriculture-related telecentre established at a small-scale Water User Association in South Africa. The dream was to lead this deep rural agricultural community at the Thabina WUA to some kind of self-management in terms of its only means of food security and hope for economic survival, with the hope of progress towards commercial farming.

The Thabina irrigation scheme was subjected to investigation by many researchers. One of the most important studies was the research undertaken by the University of Pretoria in collaboration with the French Centre d'etude du Machinisme Agriole du Génie Rural des Eaux et Forêts (CEMAGREF). The project leaders, Perret *et al. (*2003:32) note the following regarding the negative circumstances at the Thabina WUA in their Final Report on *The Thabina irrigation scheme in a context of rehabilitation and management transfer: Prospective analysis and local empowerment:* "The WUA must start developing an information system in order to document the farmers' decisions and strategies on crops". It is therefore important to note that Freire (1998) cautioned that the experiences about which the community feels strongly, should be explored – such as the need for such a 'telematic' centre – in other words, a telecentre.

This 'telematic centre', the support structure in the form of the telecentre, has the objective to provide appropriate information and communication for rural-agricultural development. The telecentre should be able to convert high-technology information into a simple, practical and understandable format to the farmers. The telecentre can therefore also create the infrastructure (information and communication technologies) as well as the infostructure (applicable information) and enable communication. The farmers could be empowered to communicate with agriculture-related organisations such as the cooperative for orders, and most importantly, to the DWA for adhering to the rules and regulations for a WUA – which led to the main objective of an irrigation scheme, namely getting production going and reaching markets, according to De Lange *et al.* (2004) - experts in the establishment of agricultural development, with extensive research in the Limpopo Province. As a priority to support these WUA's, the Directorate Water Management Institution Governance included information management in their policy guidelines, which would be supported by the establishment of telecentres at these WUA's.

As most of these schemes proved, the Thabina irrigation scheme was not entirely successful, not only due to a lack of funds, but also due to the economic and financial failure of the scheme, which forced some of the farmers (Ward C and Ward D) to evacuate their farms at some stage. Factors hampering the sustainability of the Thabina irrigation scheme are explained and discussed in Appendix A. Information and communication, as one of the eight pillars of development (Denison & Monana, 2007) was not yet part of the development at Thabina. Information and the dissemination of information will always remain of critical importance to the farmers at these WUA's, irrespective of the un-conducive environment. More important is that the information obtained from the information and communication technologies hopes to address the agriculture-related needs as well as the socio-economic needs and ICT needs of the community.

The Section above described how exceptional Thabina is, as the first small-scale irrigation scheme in South Africa which was identified by the DWA to be converted to a WUA and that the needs of black rural farmers were excluded for decades, as well as lack of financial aid to the homelands. This directs the discussion now to the background against which the study was undertaken.

1.2.3 Brief synopsis of the background of the study

This section provides a brief of the original thought process of establishing a crucial support structure – or piecemeal intervention as referred to by Crosby (2000) – the telecentre, at a small-scale agricultural community at the first small-scale WUA in South Africa. The establishment of this telecentre at Thabina supported the Agricultural Research Council's (ARC's) mandate to focus extensively on rural development in order to relieve poverty at the time that this study was initiated. The process followed to establish the Thabina telecentre could hopefully provide a blue print for the establishment of telecentres that have the prospect to uplift communities at rural small-scale irrigation schemes through its extensive process. If this experiment was successful and well researched, it was hoped that it would provide a solid foundation based on scientific method and evaluation, which could be customised for not only to other small-scale irrigation schemes in South Africa (such as for Thabina irrigation scheme in this study) but also to the establishment and evaluation of a Trust, a Cooperation or any Community Development Programme.

The establishment and evaluation of the telecentre also researches and contributes to the agricultural science (identification and addressing of agriculture-related needs – known as the physical world) as well as information science with the identification and addressing of the socio-economic (Lahiff, 2000; Shah *et al.*, 2002) and ICT needs which could be referred to as the emotional world, inherent to small-scale WUA's in South Africa.

This Section explained the research regarding small-scale irrigation schemes in South Africa and gave a background on how the information and communication technologies of a telecentre could enable rural farmers to obtain, access, assess, manage and disseminate information. This gives rise to the main research objectives of the evaluation study.

1.3 RESEARCH OBJECTIVES

The preceding sub-sections outlined the importance attached to telecentres as a tool of rural-agricultural upliftment and development by providing an important ingredient in the development process – development information and communication. It also outlined the importance of the development initiative of the first WUA.

This gives rise to the research need and research objectives. In the outline provide above, it is evident that the purpose of a telecentre is to provide in the development information and communication needs of a community. To the best of my knowledge (having surveyed the literature on the subject of telecentres), there is a gap in the literature in that there is no available evidence of models followed to plan, design, execute and evaluate telecentres in a rural context in South Africa according to acceptable scientific methods and report the successes and or failures of these telecentres in attaining their goals in terms of successfully delivering the desired development information and communication outcomes to fulfil the needs of the community that it serves. There is also no solid literature available to guide aspiring telecentre developers through the processes involved to plan, design, execute and evaluate a telecentre based on participatory design (needs-based and bottom up) and phased evaluation. This gave rise to the need and subsequent formulation of a research problem by the researcher to design a scientific method for the planning, establishment and evaluation with which to research and report on the complete process followed before, during and after the establishment of the telecentre at Thabina. Again, specifically with the aim of researching and reporting the impact of development information and communication on the development of a rural-agricultural community starting out on a low level of development.

At the time of this study, no literature was available on the evaluation of telecentres, except for piecemeal subjective surveys. The examples available in the literature are briefly listed with their results, leading to the research problem/need – the complete lack of well-documented research that include proper methodology for the planning (needs-driven and participatory), design and evaluation of a rural telecentre and an evaluation of the successes and failures of achieving the development information and communication outcomes.

An evaluation in 2001 showed that 32% of the telecentres surveyed were not operating and only 8% offered access to the Internet (Benjamin, 2001b).

Between 1997 and 2000, the Universal Service Agency (USA), renamed to Universal Service and Access Agency of South Africa (USAASA) assisted with the establishment of 65 telecentres. An evaluation in 2001 indicated that 32% did not operate or had been shut down. Although fully equipped, the main reasons for their non-functionality were (a) burglary/theft; (b) technical problems (power supplies, faulty telephone lines); (c) managerial weakness (unskilled or incompetent management); (d) financial problems (debt: mostly a telephone bill they could not pay) (Benjamin 2001a). A third of the telecentres had no funds for a salary for their staff. State sponsored telecentres continued to show mixed results, with many struggling to operate effectively (Parkinson, 2005; Hulbert, 2007), though some case studies indicated financial sustainability, educational impact and/or community ownership (Mphahlele & Maepa, 2003; Etta & Parvyn-Wamahiu, 2003; Snyman, 2007). Castells (1998) was concerned that many may be excluded from the new information society leading to the much debated digital divide.

1.3.1 Discussion on the research objectives

In the following Sub-sections, the research objectives will be discussed and explained.

1.3.1.1 The central research objective was to research, plan, design, execute and evaluate a complete experiment of establishing a rural-agricultural telecentre capable of fulfilling its objectives to provide in the development information and communication needs of the community that it serves. Such a comprehensive model to establish and evaluate a rural-agricultural telecentre in South Africa has not been documented in South Africa before.

1.3.1.2 A second objective was to establish the socio-economic and agricultural needs of this rural-agricultural community and apply these to develop the information and communication needs of the community at stake. This second objective is of paramount importance to correctly identify the requirements of the telecentre, but in order to get to this objective, the correct participatory processes need to be developed. Furthermore, this objective includes the objective of using scientific methods to analyse and evaluate the telecentre for its ability to successfully provide the appropriate development information and communication based on the specific rural-agricultural nature of the needs of this underdeveloped farming community and even show that it leads to development outcomes. This second objective gave rise to the following sub-objectives:

The central research objectives are further refined into the following research questions:

- What would be an appropriate model for the planning, execution and evaluation of a rural agricultural telecentre?
- To what extent will a participatory, bottom-up approach be a suitable theoretical departure point for the investigation and evaluation of a model for the establishment of a

sustainable telecentre in a small-scale irrigation scheme in the Limpopo Province in South Africa? Could the involvement of the researcher with the research participants, by means of taking field-notes and explaining to and discussing all decisions made with the research participants and involving the research participants in the preparation of documents, establish enough rapport with the research participants to win their trust for them to be willing to participate in the study?

- What are the roles of infostructure and infrastructure and access to such a telecentre at a small-scale irrigation scheme in the Giyane district of the Limpopo Province in South Africa? The infrastructure will be new to the research participants – will they be confident to engage in such a new venture? Could the infostructure be applicable to the research participants – will they understand the messages and will they need a manager at the telecentre to translate the messages from the information and communication technologies into their own indigenous languages?
- Which information and communication technologies could be identified and acquired for a telecentre at a small-scale irrigation scheme in the Giyane district in the Limpopo Province in South Africa? Could suitable and applicable information and communication technologies be identified which could enable constructive communication systems to the farmers at an irrigation scheme?
- How can the members of the small-scale irrigation community of Thabina be transformed from recipients of technological know-how to optimal users of technological know-how? Could the research participants learn to manage and operate the information and communication technologies to the extent where they could become not only recipients, but also productive users;
    - What is the importance of setting up guidelines for the running of a telecentre? Is previous experience in the operation of the information and communication technologies necessary and if not, would he/she be willing to learn how to operate the information and communication technologies;
    - Would he/she be able to translate the messages from the information and communication technologies into the indigenous languages of the peoples; and
    - Would the Manager assist to train the community members in the use and operation of the information and communication technologies?
- What evaluation measures are appropriate for evaluating a rural, agricultural telecentre, established by means of the model?

The core of these research objectives, refined into research questions, is the humanistic characteristics – the interpretation and the participatory traditions. The research focuses on the Thabina small-scale irrigation scheme in South Africa, identified by the Department of Water Affairs (DWA) to be converted to a WUA, according to the National Water Act (NWA). The establishment of a pilot telecentre at a small-scale irrigation scheme in South Africa has, by means of the development information and communication offered, the potential not only to identify and fulfil the agriculture-related, socio-economic and ICT needs of the farmers, but by purposefully taking a bottom-up approach to design the phases of planning, execution and by evaluating each phase with scientific PM&E methods, this study will fill the gap in the literature by providing researches with a comprehensive phased approach to learn from when planning, designing, executing or evaluating other rural telecentres in South Africa and even perhaps abroad. To this extent the broad and main research objectives may be summarised as follows:

The two central primary research objectives are to develop a model for the planning and execution of the project to establish a rural-agricultural telecentre and to develop a method suited to the monitoring and evaluation of a small-scale rural-agricultural project. This research objective requires careful consideration of the development of research tools in recent years, capable of successfully measuring the performance of the type of project. Firstly the researcher considers how successful different research methods are in various applications, and then selects the most appropriate aspects of each method for the design of an evaluation and research tool specific to the project.

The central third objective of the research – once the most appropriate research method is developed – is to apply this scientific method to monitor and evaluate each step and process of the establishment of the WUA telecentre at Thabina, from the Pre-establishment Phase through the Establishment Phase.

Once these central objectives have been met, this research would make its contribution in three main areas, viz. the design of a model for the planning and establishment of a telecentre, the evaluation and design of the appropriate monitoring and evaluation research method, and thirdly, monitoring and evaluating the complete process followed during this project, including the evaluation of the extent to which the telecentre was able to meet developing information and communication needs. This is the first evaluation of a rural-agricultural telecentre following participatory monitoring and evaluation principles.

Not only will this contribute to the literature on the project planning of a telecentre but the monitoring and evaluation research design, and the literature on the processes, successes

and failures of deep rural telecentres and their impact on socio-economic development outcomes (how did developing information and communication contribute to this?).

The telecentre enables information and communication. In order to systematically study the structure and the behaviour of the physical (small-scale irrigation scheme with its surroundings, environment and water-related issues) as well as the emotional world (overt and covert communication including the needs, problems, fears and aspirations – NPFA) of the farmers at the Thabina small-scale irrigation scheme, participatory interaction would be required. Although some aspects are noted as prescribed by theorists and researchers, new concepts such as the various professional values of the person-centred facilitation approach, or 'units of knowledge' as it may be called, are innovatively integrated with the participatory approach of the study. A study of this magnitude also has its impact on and value to the organisations where it originated. Since the research was initiated by the researcher with the full consent of the Agricultural Research Council (ARC), the value of the study for the ARC will be explained below.

1.3.2 Value regarding the Agricultural Research Council (ARC)

The ARC (2012) is a vast repository of the information that farmers need. However, effective communication between the farmer and the ARC remains a challenge. The telecentre model is proposed as a means of bridging this gap, by facilitating access to the information and communication technologies required to be able to source and manage the information farmers need.

The Thabina telecentre is perceived by its immediate stakeholders to be of enormo us value. However, its real value is to be found in a broader context, as it presents the opportunity to incubate a range of information and communication technologies. Since it also addresses the mandate of the ARC regarding poverty alleviation and rural development, the value lies in the development of a tool that the ARC could use to plan, execute and evaluate the success of the application of information and communication technologies to achieve their development goals through development communication. It is, in effect, a laboratory to evaluate and improve information and communication technologies designed to enable effective exchange of knowledge and information with farmers who otherwise would have been severely deprived of the means to communicate. This allows role-players from the information and communication sector to improve their information and communication technologies, and allows the ARC to improve its ability to engage in effective dialogue with farmers. The telecentre is also proving to be of great value to other stakeholders, as it is being used to enable communication about social services, health care and economic opportunities, and provides systems that allow local entrepreneurs to manage their business records by computer rather than by hand.

Many countries have benefited from the concept to nurture and support innovative ideas such as development incubators. Such incubators have the infrastructure and resources for successful technology business and utilise technology as a means for their economic development (Perret *et al.*, 2003). The emphasis is on business and professional services necessary for growth of the technology and technology based enterprise (Brandt, 2000). New technologies, increased involvement of educational institutions in technology transfer, and economic globalisation have been the most important factors for the growing number of new incubators in the United States.

Although the Thabina irrigation scheme has several constraints such financial and literacy constraints, the potential still exists for the Thabina telecentre to be regarded as a development incubator. The development, piloting and improvement of systems at Thabina are intended to enable the roll-out of successful information and communication technology strategies and approaches to other telecentres with the Tswelopele irrigation scheme, New Forest irrigation scheme and Oppermansgronde irrigation scheme as current examples. After the rehabilitation as well as good rain after the downfall of the Thabina irrigation scheme, the local Thabina stakeholder community enjoys access to the latest information and communication technology products, with the understanding that not all will perform as intended, and also that not all services, such as the Internet, would be available due to financial constraints. The local stakeholders of these other telecentres enjoy the benefit of information and communication technologies of which the performance has been proven at Thabina. Although this ensures efficiency in the use of scarce resources (Kirsten & Van Zyl, 1998; Perret *et al.*, 2003) in the research and development of systems that will underpin rural development, each study has its own boundaries, which will be discussed in the following Section.

1.4 DEMARCATION OF RESEARCH

There is often the assumption that local ‘communities’ exist as distinct entities: small, well-bounded and integrated (Schwarts, 1981). This was the situation with this farming community, where needs, values, sentiments and ideologies are shared (Cornwell & Jewkes, 2007) since this study was undertaken at the Thabina community, which includes surrounding rural agricultural villages such as Kop, Lefara, Zangoma, Muhlaba Cross and Burgersdorp. These surrounding villages were consequently included in the assessments of the agriculture-related information needs as well as the socio-economic needs and the ICT needs of the Thabina community.

The Thabina community is situated in the Limpopo Province, about 24 kilometres southeast of Tzaneen, in a tranquil rural area at the foot of the Rita Mountain. Situated in the Giyani

district, it is generally a poor area as it was a former homeland. As with most irrigation schemes in these former homelands, many problems were encountered, ranging from a dilapidated irrigation scheme (poor systems, canal and water catchment area) to lack of funding from government, as explained in Appendix A.

It is, though, not only the Thabina community that benefits from this study, as the process that was developed for the establishment and the evaluation of the telecentre can be adapted and modified for the establishment and evaluation of a Trust, a cooperation or any Community Development Project. The process developed in this study was adapted and tailor-made specifically to address the agriculture-related needs as well as the socio-economic needs and ICT needs of the Thabina community.

In studies undertaken globally in the agricultural sector, the following defined terms are well-known and fundamental – especially to the small-scale agricultural sector, as explained in the next Section.

1.5 DEFINITION OF TERMS

Definitions of the most important concepts used in the study are explained in this Section.4

1.5.1 Connotations compared to the South African context

The concepts on developing communities below all have connotations that are particular to South Africa. These connotations have their roots in South Africa's political history and appear to have arisen from the need to remove racial reference in concept definitions. This has affected the way in which these concepts are used and understood in day-to-day communication in South Africa, which is a huge contribution to the development of rural communities at small-scale irrigation schemes. Their local meaning tends to differ from the universal meaning, at times disturbingly so. Where applicable, the universal meaning is used but where necessary, an explanation is provided of the South African meaning and use of the specific concept. This section was compiled in collaboration with the thoughts, ideas and suggestions from various researchers and theorists (Kirsten & Van Zyl, 1998; Shah *et al.*, 2002; Van Averbeke, 2006; Van der Merwe, 2007).

- **Developing communities**

This concept was introduced in response to criticism to the distinction that was made in the past between developed and undeveloped or underdeveloped, which was said to be a value judgement and demeaning for those called underdeveloped, conclude several researchers and theorists (Van Averbeke, 2006; NationMaster, 2009; Techbridgeworld, 2009). These concepts were constructed by rich societies who considered their own status as a standard and then referred to top societies which did not achieve the same standard as being

'undeveloped' or 'underdeveloped'. The term 'developing communities' or 'developing countries' was introduced because it implied urgency on the part of these societies to improve their situation, on their way as it were, to achieve a status similar to that of developed societies. Fact of the matter is that all societies are in a continuous state of development, and that development is not a linear process, meaning that there are various ways in which a society can develop and this should not necessarily follow the path of the western world.

Developing communities or countries are also referred to as those that are in a developing path in certain socio-economical sectors. Their relative achievements or progress in these sectors are usually measured in terms of standards and indicators set internationally in those sectors for comparison purposes.

There are of course verifiable or measureable indicators of development and these relate to universal human needs and rights, such as access to water, food, shelter, safety, education, health services, etc. These indicators are summarised in the form of the Human Development Index, and when the underlying indicators are accepted to reflect the state of development of societies, the Human Development Index allows for the objective measurement and assessment of the state of development of a society, as is done by the UNDP and described by Techbridgeworld (Techbridgeworld, 2009) and NationMaster (NationMaster, 2009). This argument is used to provide the basis for a very simple definition.

- **Developing communities (South Africa)**

In colloquial language in South Africa, developing communities usually refers to poor black communities, particularly rural and some peri-urban communities. However, there is no reason not to use the universal definition, because in contemporary South Africa there are probably a few white communities that would be categorised as 'developing' and there is no reason to limit application of the concept to rural communities only (Kirsten & Van Zyl, 1998).

- **Developing communities (universal)**

Developing communities are communities characterised by low human development index (Van Averbeke, 2006; NationMaster, 2009; Techbridgeworld, 2009).

1.5.2 Development may be defined as "cultural change" which involves better-quality livelihood for a developing community. The current communication revolution will also lead to impacts on culture. In consequence, adds Joseph Burcet (2002), peoples will experience and undergo huge innovations in a very short period of time, including several forms of digital divide. Meanwhile, the vast majority of people may not be able to handle it. This will happen due to the current communication revolution – the magnitude of cultural change is

proportional to the amount of communication increase. The information and communication technologies will change the rural community's concept of language and skills, as well as accessing information and the dissemination thereof – rural indigenous (oral) communication systems will be replaced by using information and communication technologies instead.

The ability to cope with this high-tech novelty depends on some individual characteristics, but mainly on the culture people's use as well as the social framework in which people live, incorporating the literacy rate. There is good reason why the information and communication technologies at a former dilapidated irrigation scheme in South Africa are called high-tech 'novelties', as these irrigation schemes in the Giyane district with special reference to its financial status, would hardly be able to afford these information and communication technologies, as described above by various researchers and academics (Crosby *et al,* 2000; Van Audenhove, 2001; Van Averbeke, 2006; Van der Merwe, 2007). Despite the financial aspects, the literacy rate at these irrigation schemes is low as well, especially in the language of the information and communication technologies – English. These information and communication technologies also influence the farmer's approach to farming as well as their willingness to incorporate new farming practices. Through the telecentre they become exposed to more advanced and modern techniques which could improve their dated farming practices.

From this it is obvious that only the community itself can determine what constitutes "development" – thus community participation must be an integral component of all development projects (Dahms, 2001).

Development is also regarded as a broad participatory process of social change in a society that tends to bring about both social and economic advancement, including greater equality, freedom and other valued qualities, for the majority of the people by them gaining greater control over their environment (Bandura, 1998).

1.5.3 Development Support Communication (DSC) is a strategy to target specific groups of people with new ideas, information and information and communication technologies to get rural communities to participate in development programmes. In a comparative table compiled by Jayaweera and Amunugama (1989), it is pointed out that DSC differs from Development Communication (DC) in the following respects: DSC applies to micro or local entities, it is goal orientated and concerned with effects, it is time bound, message orientated, uses a whole range of culture-based media, is invariably interactive and participatory and has gained enormous credibility.

1.5.4 Information provision is defined by Blom (1980) as the input received that can be processed realistically and sensibly in order to obtain knowledge. Problem solving could be indicated by meaning and decision making that leads to development.

According to Leach (1999), information needed at the telecentre is interactive, since the rural adults are themselves providers of their tacit knowledge – information is shared and the oral format in a workshop situation lends itself to this. When information is interactive, it is shared by the developer and those to be developed, as the developer has new information and those to be developed have their own information on current practices ("how things are done now") (Leach, 1999:77).

1.5.5 Information and Communication Technologies (ICT) is an enabling technology – it is a means not an end. In only a few cases will ICT be a core technology and, therefore, the objectives of a project ICT related (Shah *et al.,* 2002; Van der Merwe, 2007). In this study information and communication technologies refer to the computer without Internet connectivity and e-mail, the basic telephone, the multifunctional printer and the library at the Thabina telecentre. According to O'Farrell and Norrish (1999), information and communication technologies enables new methods of communicating and exchanging information and knowledge, that can also replace existing information systems and networks. Defining the particular roles that information could play and where information and communication technologies might be most effectively applied, are some of the challenges faced by those working in information and communication technologies, as well as to be honest about what they cannot do.

1.5.6 The **Internet** is a collection of computer networks that have been linked together to allow information to be sent from one network to another. It is the carrier for the World Wide Web (Web, WWW or W3) service, just like telephone networks are carriers for services like voice communications (IICD, 2000a).

The Internet, when afforded, allows users to be a sender and disseminator of information as well as receiver of information from developmental organisations. The Internet not only offers two-way and horizontal communication but also opens up new non-traditional communication channels for rural communities (Colle & Roman, 1999). The Internet is a global "peoples' network" (Colle & Roman, 1999:24): for communicating and sharing information. It consists of two powerful tools – e-mail and the WWW (Colle & Roman, 1999).

E-mail: Short for *electronic mail,* exchanges, conveys and disseminates messages between individuals by means of communications networks, using computers. Through an e-mail system, computer users send text, graphics, and sometimes sounds and animated images to other users.

WWW: The World-Wide Web was developed to be a pool of human knowledge, and human culture, which would allow collaborators in remote sites to share their ideas and all aspects of a common project (Rusinkiewics & Zhang, 2005), since it gives users access to a variety of documents that are connected to each other by means of hypertext or hyperlinks.

The **World Wide Web** (abbreviated as **WWW** or **W3** and commonly known as **the Web**), links hypertext documents via the Internet. The web is easy for anyone to browse and contribute to by means of hypertext and multimedia techniques (Rusinkiewics & Zhang, 2005). Rusinkiewics and Zhang (2005) continue that with a web browser, one can view and navigate web pages containing text, images, videos, and other multimedia via hyperlinks.

A hypertext document with its corresponding text and hyperlinks is written in HTML and the individual HTML files with unique electronic addresses are called Web pages, presented on a website which is a collection of Web pages and related files (such as graphics files, scripted programs, and other resources) with the same address (*see* domain name). Users gain access to a page by typing in the applicable address and can also search for pages related to a topic by using a search engine, or move quickly between pages by clicking on hyperlinks incorporated into them (Rusinkiewics & Zhang, 2005).

From the Web, farmers could enter websites of various cooperatives to compare prices of seeds, cultivars as well as farming implements. It is also important for farmers to attain product prices through websites as well as short-term weather forecasts.

1.5.7 Technophobia

When information and communication technologies are introduced into a community, some members may be reluctant to use that technology. They may be anxious or they may be fearful of the new technology, which is called technophobia (Gillman, 2006; Roman & Colle, 2006). This reluctance could create a barrier to the broader use of information and communication technologies, including those that are telecentre-based (Roman & Colle, 2006).

1.5.8 Telecentre

The telecentre has been called differently by various researchers and theorists and provides a wide range of services by means of a variety of affordable information and communication technologies, as described in Chapter 3 in Section 3.3. The term telecentre is used in this South African situation – not in urban areas, but specifically in rural areas at WUAs, where the main activity is farming practices. These farmers at small-scale WUAs are poor and mostly illiterate and are dependent on their environment, especially to be noted as South Africa is a water scarce country (Kirsten & Van Zyl, 1998; Perret *et al.*, 2003). If they do not

have water to irrigate, they do not have yields, and subsequently, do not have funds to buy these information and communication technologies or to make use of them.

The community telecentre, explain Jensen and Esterhuisen (2001) is owned by the community itself, because of its potential to address the needs of people in a way that empowers the community it serves. The Thabina telecentre is also utilised as a community centre for workshops held with farmers (Johnson, 2003). This evaluation study showed that the Thabina telecentre is utilised by the farmers to gather for their meetings and to receive visitors. The telecentre is also used to accommodate gatherings of social groups such as church groups, women's groups, as well as the community members for lectures on nutrition, management, HIV/Aids and the vaccination of the children of the community of Thabina and surrounding communities.

For this study, however, the term telecentre can be described by the following characteristics (Benjamin *et al.*, 2000):

- **Location**: The telecentre is, like MPCC and the USA telecentres, located in a formal building that is durable, provides protection for equipment and has space to allow for the possible expansion of facilities. It should be accessible to the community and become associated in the minds of users with other resources.
- **Infrastructure**: A typical centre is equipped with a variety of equipment and offers a wide range of services, from telephony to fax, photocopying, Internet and other computer-related services such as the creation and printing of CVs and any type of document. The rural telecentre in South Africa should therefore be financially supported by government in order to be able to acquire the various applicable information and communication technologies.
- **Management**: The strength of the telecentre management lies in the Manager's understanding of the local community and his/her vision for growth and expansion in terms of impact on the local community, as well as a sound knowledge of business and technology. According to research (Colle & Roman, 1999; Benjamin & Dahms, 2004) the profile and qualities of the Manager would include the following: A sound knowledge of the activities of the specific community (farming, etc.) (Martin & Rader, 2003); strong personality with the skills and responsibility of interacting with the users (Rao, 2008); must understand the needs, fears and problems of the community; must be sufficient literate to be able to explain the messages received in the language of the information and communication technologies in the indigenous language of the people it serves; must be able to convert high-tech messages into local, practical and understandable messages; should be able to train users on the information and communication

technologies (Sein & Furuholt, 2009; Bailey & Ngwenyama, 2011); and be able to disseminate agriculture-related information to the farmers (Alibaygi *et al.*, 2011).

- **Ownership**: A telecentre is owned by the Management Committee appointed by the community itself. The Management Committee of the Thabina Water User Association was appointed by the Thabina farmers when they applied to be converted from an irrigation scheme into a Water User Association. The Management Committee appointed comprised the Chairman, Mr DZ Mtebule, Mr William Shayi and seven members. The community was thus represented by their Management Committee who was able to drive its own upliftment through the opportunities presented.
- **Users**: The facilities and services should draw users from different age categories and occupations in the community.

With the Definition of Terms used in the study explained, focus can now be directed to an overview of the research design and methodology used and applied in this study.

1.6 OVERVIEW OF RESEARCH DESIGN AND METHODOLOGY

The central research objectives are investigated through scientific participatory research methods that have been developed and adapted from recent research and that is specific to the project being evaluated.

This research is supplemented with a vast body of literature. In other words large parts of this thesis comprise desk research. This is essentially an ethnographic study, undertaken according to the participative school, to find and design an appropriate model that is able to be used to plan and execute the establishment of a telecentre according to participatory methods and analyse and evaluate the framework (Phases) and Actions of the phases of the model by means of PM&E principles. Before the research design and methodology is comprehensively and systematically described and explained in Chapter 4, it is necessary to rationalize the justification and underlying principles of the study.

1.7 RATIONALE OF THE STUDY

The study is undertaken in order to investigate the possibility of designing and evaluating a process for the establishment of a sustainable telecentre at a small-scale water user association (WUA) in the Giyane district in South Africa. The **aim** of the study is therefore to explore whether applicable and appropriate communication that could lead to development, could be provided and offered by the information and communication technologies, offered by a telecentre.

Since the withdrawal of all government aid from the homelands in South Africa in 1996, these irrigation schemes have become dilapidated (Lahiff 2000; Stimie *et al.*, 2001; Shah *et*

al., 2002; Van Averbeke**,** 2006). Recently, government has identified some of these irrigation schemes, such as Thabina irrigation scheme, to be assisted with development.

The **reason** for the undertaking such apeace-meal intervention as referred to by Crosby *et al.* (2000), is that according to the National Water Act, (NWA), (Act 36 of 1998), all irrigation schemes as well as all irrigation boards, are to be transferred into a WUA. A WUA is an Institutional Structure where the members could make decisions, oversee their infrastructure, and communicate with DWA regarding the NWA, etc. Thabina was then also the first small-scale irrigation scheme to become a WUA. The NWA also stipulates that an **information system** should be established at the WUAs, since the farmers at the WUAs are now, according to the NWA, obliged to report to the Department of Water Affairs on monthly accounting and management information regarding their water used, their water use efficiency as well as their monthly and annual water budgeting.

The **benefits** to be gained by the farmers (research participants) is that they could communicate with other agriculture-related organisations; have a computerised management system to run their WUA; as well as a computerised financial system which could assist Management with the calculation of their monthly and annual financial aspects to be submitted to the DWA.

Although such a venture was a first for South Africa, the researcher is confident that this could be a success story that could serve as a blueprint for the establishment of telecentres at other small-scale irrigation schemes country-wide. It should be noted, though, that such a venture could only succeed if an applicable methodology were employed.

The **risks** of the study could be the issue of language. Considering that the small-scale farmers at these irrigation schemes are mostly illiterate, speaking only the indigenous language, it is required that a bottom-up, participatory methodology be followed. This means that the benefits outweigh the risks, and not only means that the agriculture-related as well as ICT needs and the socio-economic needs of these farmers should be identified, but also that these farmers should be involved in all decision-making processes. This could lead to these farmers perceiving the telecentre as their own. Since the concept of a telecentre as well as the information and communication technologies, on which a telecentre is based, is a concept of the developed world, it would also be necessary to divide this methodology into agreed and determined actions, categorised into the consecutive phases of the establishing and evaluating process. This would help and assist and support the farmers to comprehend the actions, and also to enhance the flow of the practical implementation and evaluation of a telecentre.

Sustainability of such a telecentre at a rural irrigation scheme for subsistence farmers should be researched regarding various aspects such as financial sustainability; social and cultural sustainability; political sustainability and technological sustainability, as described and recommended by Stoll (2006), Colle (2006), Fundacion Chasquinet (2006) and McConnell (2007). The model will be **evaluated** according to the PM&E principles, which means that feedback will be presented in a collaborative, bottom-up approach where the suggestions and the ideas of the farmers will be taken into consideration: Formative at the end of each Phase, and summative at the end of the Evaluation Phase. But how such a comprehensive study structured, will be explained in the next Section.

1.8 STRUCTURE OF THE STUDY

Chapter 1 comprises an introduction to the study. A background to the study is followed by an explanation of the research objectives and the participatory process. The rationale and the value of the research are explained and are followed by the demarcation of the research. The definition of terms is followed by the section on the participatory model and methodology. The structure of the study is then explained.

The Literature Review is provided in **Chapters 2 and 3.** Chapter 2 forms the first part of the Literature Review and opens with an explanation of the situation and environment of the Thabina irrigation scheme where the telecentre was established. It also presents a résumé of the role of information and communication technologies in development, and in the processing and transfer of information in the information age. The concepts telecentres and information and communication technologies are followed by an explanation of the digital divide and how this divide could be bridged. Chapter 3 forms the second part of the Literature Review and the direct link between information and the transfer of technology, which includes the transfer of technology, is discussed. The potential role of telecentres in bridging the digital divide is explained. The telecentre as such, with its potential role as a tool to bridge the digital divide, is explained.

Chapter 4 presents the participatory process and methodology of the study. Various models from theorists and researchers are researched, evaluated and applied for creating a generic four-phase participatory process for the establishment and the evaluation of a rural, agricultural telecentre – the framework as well as the various Actions to be undertaken in this framework (four phases). The participatory research approach is explained as well as the Participative Monitoring and Evaluation (PM&E) principles to which the establishment of the Thabina telecentre is evaluated in this study. Data collection methods and sampling methods are explained.

Chapter 5 discusses the pre-establishment actions for the study and forms the first phase of the four-phase participatory process according to which the study was set out. The various actions are discussed as well as the lessons learnt.

The preparatory actions undertaken for the study are discussed in **Chapter 6.** This chapter forms the second phase of the four-phase participatory process. This chapter comprises various agreements on documents between the Management Committee and the researcher, which are based on the lessons learnt from the pilot project discussed in chapter 3

Chapter 7 forms the third phase of the four-phase participatory process, and comprises the actual establishment of the telecentre as such. It discusses how the information and communication technologies were implemented as well as the training in the usage thereof. The documents compiled and the training undertaken are also discussed.

In **Chapter 8** the study is evaluated. Although the actions undertaken in each phase are formatively evaluated at the end of each phase, this phase holds the summative evaluations according to the participatory paradigm. This is then the fourth and the last phase of the four-phase participatory process.

Chapter 9 presents the conclusions and recommendations of the study. The successful answer to the research objectives is explained and aspects to take into consideration when establishing a telecentre are discussed. Recommendations are made. The reliability and validity are explained and aspects for future research are discussed.

1.9 SUMMARY

Section 1.1 opens an Introduction of the study – the setting and background of what could be expected from the study. Section 1.2 discussed the empowerment by means of information and communication technologies with Sub-sections 1.2.1 on research regarding small-scale irrigation schemes in South Africa; 1.2.2 regarding background to the telecentre at the Thabina irrigation scheme; and 1.2.3 with a brief synopsis of the background of the study. Section 1.3 explained the research objectives with the following sub-sections: 1.3.1 with a discussion on the research objectives; and 1.3.2 an explanation of the value regarding the Agricultural Research Council (ARC). Section 1.4 offered the demarcation of research, followed by Section 1.5 that gave an overview of research design and methodology. Section 1.6 explained the definition of terms with the following sub-sections: 1.6.1 on the various connotations compared to the South African context; 1.6.2 on development; 1.6.3 with Development Support Communication (DSC); 1.6.4 regarding information provision; 1.6.5 concerning information and communication technologies; 1.6.6 about the Internet; 1.6.7 on technophobia; and 1.6.8 regarding the telecentre. Section 1.7 followed with an overview of

research design and methodology and Section 1.7 explains the structure of the study. Section 1.8 presents the summary of the Chapter.

CHAPTER 2 – DEFINING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND EXPLORING ITS ROLE IN DEVELOPMENT

The information revolution

> *"When one looks at Information and Communication Technology (ICT) the question should not be whether it has impacted the day-to-day business and social life, but rather how equitable this impact is and how significant it is in addressing the main problems faced by society today".*
>
> *Badimo (2005), Instituto del Tercer Mundo*

2.1 INTRODUCTION

Chapter 2 forms the first of two Chapters of the Literature Review of the participatory project. This Chapter will review literature regarding the information and communication technologies which will conclude that global cyberspace for communication is a global spatial visualisation of all information processing systems along present and future communications networks, which enable interaction of numerous users; allowing essential communication through input and output from users and supporting development in rural, indigenous areas (Van Audenhove, 2001; Heeks, 2004; ITU (2004); Joseph, 2006; Rao, 2007; Assefa *et al.,* 2010; Colle, 2011c).

This Chapter is consequently devoted to a review of literature that not only defines information and communication technologies (ICTs), but will explore the literature on how information and communication technologies, according to various researchers and observers, influence development. It will also explore the idea of the digital divide and again, according to various researchers and observers, how this digital divide may be bridged. This will lead to a discussion on the requirements for information and communication technologies to be successfully implemented. The idea here will be that once the requirements for the successful implementation of information and communication technologies are known, it will be possible to use these requirements as a yardstick to evaluate the progress made with regard to the introduction of information and communication technologies. Literature relating to the progress made with regard to the successful implementation of information and communication technologies through the provision of infrastructure and infostructure will be explored in relation to global, African and South African cases. The last part of this Chapter will be devoted to literature on the role of information and communication technologies for development in South Africa.

This chapter will unfold as follows: Section 2.2 will define information and communication technologies with Section 2.2.1 discussing the varieties of information and communication technologies and Section 2.2.2 explaining the services provided by information and

communication technologies. Section 2.3 will explore literature on the relationship between information and communication technologies and development with Section 2.3.1 dealing with the characteristics, applicability and usages of information and communication technologies. Section 2.3.2 will then discuss literature on how the digital divide could be bridged. Section 2.3.3 will remark on the role of information and communication technologies in bridging the digital divide. Section 2.4 will look at literature that explains what is needed to successfully employ information and communication technologies, under the sub-headings 2.4.1 Infrastructure and 2.4.2 Infostructure. Once the role of infrastructure and infostructure has been explained in establishing information and communication technologies delivery mechanisms, Section 2.5 will discuss literature on the state of infrastructure and infostructure: Section 2.5.1 Infrastructure globally; Section 2.5.2 Infostructure globally; Section 2.5.3 Infrastructure in Africa; Section 2.5.4 Infostructure in Africa; Section 2.5.5 Infrastructure in South Africa; and Section 2.5.6 Infostructure in South Africa. Section 2.6 will finally return to the issue of information and communication technologies and how it relates to development in the agricultural sector of South Africa. Literature on the progress of information and communication technologies for development will be investigated as it relates to South Africa.

The publication, *The A-Z of Social Research* (Da Silva Rodrigues, 2009), defines a literature review as "a systematic search of published work to find out what is already known about the intended research topic." But a literature review could also identify a motive or purpose for a study, increase the views and viewpoints of an investigator, and prevent a researcher embark on research previously undertaken.

Bless *et al.* (2000:16) supports this view and concludes that a literature review allows the "researcher to find out what has been done in terms of the problem being investigated - to ensure that duplication does not occur".

Bless *et al.* (2000: 24 - 25) gives more specific reasons, which include the following:

- To improve and expand the theoretical framework of the research;
- To familiarise the researcher with the latest developments in the scope of research;
- To identify gaps and weaknesses in earlier studies;
- To discover similarities and inconsistencies between different research results by comparing various investigations;
- To identify variables that must be reflected in the research;
- To study the definitions used in previous studies as well as the characteristics of the peoples investigated, with the aim of adopting them for the new research;

- To study the advantages and disadvantages of the research methods in order to use or improve on them in one's own research.

Leedy (2014) notes that the more informed and familiar you are, the better you will be able to recognise and value your challenge. Subsequently the purpose of the literature review was not only to identify and analyse preceding research, but also to gain insight and understanding into the current situation.

From the literature review, information for this study was collected regarding:

- The meaning of multiculturalism and multicultural development;
- The opinions of various theorists abroad on development in a rural, agricultural community;
- Existing guidelines for development processes and methods which support the ethnographic paradigm.

The South African literature review focused on literature that has a direct or indirect bearing on multicultural development procedures. It highlights South Africa's unique road to community development of the diverse cultural communities in South Africa – regarding their separate and unequal development.

This Section presented a Literature Review regarding the execution of a participatory project, which leads to the next Section where information and communication technologies will be defined, with reference to literature, as discussed.

2.2 DEFINING INFORMATION AND COMMUNICATION TECHNOLOGIES

In the next Section the ranges of information and communication technologies will be explained according to its hardware and software as well as its four characteristics.

2.2.1 Types of information and communication technologies

USAID (2004:45) defines information and communication technologies as “a combination of hardware, software, and the means of production that enable the exchange, process, accessing, assessing and management of information and knowledge”. Regarding the exchanging and communicating features of the information and communication technologies, USAID (2004) is in line with O’Farrell and Norrish (1999), who are of the opinion that information and communication technologies offer new means of communicating and exchanging information and knowledge – where the ability to communicate forms the basis for development. In order for information and communication technologies to be able to perform such functions, it could be described in relation to how they may help “developing communities develop, particularly to revive, store, preserve and popularize their cultures”

(Lekoko, 2010:57). Lekoko (2010:62) continues that these information and communication technologies may thus be seen as "artifacts" that make it possible for indigenous, developing communities to share information among themselves and with other communities for development purposes. Regarding these developing communities, Jensen and Esterhuisen (2001) advise that information and communication technologies are mechanisms offering a developing community means to not only communicate internally and externally, but also to manage their own development. Services of information and communication technology thus include methods for storing, managing, and processing information (e.g. computers, software, digital and non-digital libraries) and, says Saravan (2011: 79 - 82), for communicating information (e.g. e-mail, radio and television, telephones, cell phones, pagers, instant messaging, the Web). The fax (a communicating technology) and the scanner and photocopier (processing technologies) could be added to these information and communication technologies. Colle (2011a) also advices, as most authors believe, that information and communication technologies should include the traditional media such as radio, telephone and television along with newer digital technologies such as the computer with Internet and e-mail and the mobile phone. This means that information and communication technologies can potentially link developing communities to the information super-highway, without "downplaying these cultures in favour of what is considered as the global culture" (Harris, 1996: 5 - 13).

Information and communication technologies are also seen as a range of electronic information and communication technologies by researchers:

> "… those information and communication technologies that can be used to interlink information technology devices such as personal computers with communication information and communication technologies such as telephones and their telecommunication networks … A range of electronic information and communication technologies which when converged in new configurations are flexible, adaptable, enabling and redefining social relations" (Greenidge, 2004:2). USAID (2004) agrees on the aspect of the accessibility and convenience of electronic information and communication and Enahoro (2010:250) adds that "information and communication technologies includes a range of technologies used to support communication – well-known applications are Internet, Geographic Information Systems, Database Management Systems and Multi-media tools".

Information and communication technologies facilitate the creation, storage, management and dissemination of information electronically. Such an understanding includes radio, television, fix-net and mobile telephony, fax, computer and the Internet. Some researchers

(Gerster & Zimmerman, 2003:9; Greenidge, 2004:2; USAID, 2004) also refer to the four characteristics of the information and communication technologies as the following:

- "Interactivity" (Greenidge, 2004:2) – information and communication technologies are effective two-way information and communication technologies;
- "Permanent availability" (USAID, 2004) – information and communication technologies are available 24 hours a day;
- "Global reach" (Greenidge, 2004; USAID, 2004) – geographic distances hardly matter any more; and
- Reduced costs for many – "relative costs of communication have shrunk to a fraction of previous values" (Gerster and Zimmerman, 2003:9).

From the above-mentioned, it could be said that information and communication technologies in a telecentre – which is based on information and communication technologies (Jensen & Esterhuysen, 2001) – could range from basic telephony as a phone shop (IDRC, 2007b) to Internet connectivity (Ernberg, 1999). If the characteristics of information and communication technology are taken into consideration, it is powerful in that it can be applied to a "huge variety of sectors, and can play a powerful role in the sector of governance and empowerment" as is stated by Gerster and Zimmerman (2003:27).

The challenge for those working in information and communication technologies is to define the particular roles that information can be expected to play and where information and communication technologies might be most effectively applied, but equally to clarify and be honest about what they cannot do (O'Farrell & Norrish, 1999; Shah *et al.*, 2002; Van der Merwe, 2007). During this four-phase participatory process, the information and communication technologies referred to, will include the computer without Internet connectivity and e-mail, the basic telephone, the multifunctional printer and the library at the Thabina telecentre. The aim of these information and communication technologies will be not only to generate and create communication by means of which the farmers would be able to converse and negotiate not only with DWA and other departments, and also to support the socio-economic and ICT needs of the community of Thabina.

The opinions and ideas of various researchers and theorists on information and communication technologies have been highlighted in this Section. The discussion of Lekoko (2010) on the application of information and communication technologies to protect and conserve the cultures of developing communities is of utmost importance. This discussion leads to the identification services that could be provided by the information and communication technologies in the next Section.

2.2.2 Services provided by information and communication technologies

The information and communication technologies each with its own particular and unique services it could provide, in order to assist and support a developing community in the development process, will be discussed in this Section.

Information and communication technologies present access to an unprecedented quantity and quality of recourses such as information, skills and markets, to a community. The challenge, though, is to find the means to optimally utilise of the possibilities and abilities that information and communication technologies provide. This would include the processing and communication of information through certain input and output modes, in other words, the dissemination of information (James & Ziebell, 2003). Agreeing with James and Ziebell (2003) on the processing by means of input and output modes, it could be mentioned that each information and communication technology also has its own type of input as well as its particular function, which distinguishes each type of information and communication technology from the other. The input and output types in Table 2.1 represent the format in which messages are either fed into the information and communication technologies by the sender or assumed from the information and communication technology by the receiver.

Table 2.1 below presents the different input and output types and functions of every information and communication technology.

Table 2.1: Input and output for the various information and communication technologies

ICT	Input types	Output types	Functions
Computer	Mouse Keyboard Touch screen Audio Digital Visual	Screen Digital Audio CD	Word processing Data and information processing Communication Storing information
Printer	Digital	Print	Text
Copier	Print	Print	Duplicating
Scanner	Print	Digital	Computer input
Telephone	Audio	Audio	Communication
Cell phone	Audio Visual Keyboard	Audio Screen	Communication
Fax	Keyboard Print	Print	Communication e.g. Tele-copying
Radio	Audio	Audio	Communication e.g. mass media
Television	Visual Audio Keyboard	Visual Audio	Communication e.g. mass media
Pager	Keyboard	Audio Screen	Communication e.g. personal

Source: Researcher's compilation in participatory collaboration with role-players

- Input types: Input is fed into the information and communication technology by the sender of the message and the recipient expects a specific output to fulfill his/her specific information needs. In other words, the sender of the message, and the recipient of the message, are directly involved in this process.
- Output types: The output provided through information and communication technology to the users, should be useful, accurate, understandable and timely, in order to satisfy the information needs of the users. To achieve this objective, the users should have the correct telephone numbers, cell phone numbers, e-mail addresses, web-site addresses and fax numbers available, as well as appropriate knowledge and skills to use the information and communication technology effectively.
- The last column represents the functions of the information and communication technology in order to produce the desired output. For instance, the radio has only an audio output with a communication function, while the computer has various outputs with multiple functions such as word processing, data and information processing, communication, and storing information, depending on the need of the user.

With the services provided by the information and communication technologies, the question arises whether the information obtained from these technologies could lead to knowledge in order to assist a community in its development process. This will be discussed in the next Section.

2.2.2.1 Conveying information that leads to knowledge

This Section will look into the matter of how information that could lead to knowledge is disseminated by means of the information and communication technologies.

What information and communication technologies also ensure is the transmission of information, with growing complexity of interactive loops and feedbacks, at great speed and at a low cost. Information and communication technologies disseminate information in a way which is potentially more and more decentralised and individualised (Castells, 1985). This view of Castells (1985) concerning the potential of information and communication technologies is supported by Agunga (1998:35) who stresses that “Sustainable development has to do … with spreading of knowledge and insight …”. Ekeanyanwu (2005:78) confirms that the power of information and communication technology is in the “use to which it is put, not only in its very nature”. It could therefore be added that the information and communication technologies, regardless of the accusation leveled against new information and communication technologies, could play a potential role for purposes of development communication, e.g. the transfer, exchange and dissemination of information for development.

The link between information, knowledge and development is often discussed in literature. Houtondji (1995:2) regards this theoretical vacuum of information as substantially the same as the "industrial vacuum that characterised economic activity in the colonies". If harnessed and directed properly, information and communication technologies have the "potential to improve all aspects of our social, economic and cultural life" (Marshall *et al*., 2003:5-6). This link between the lack of knowledge and poverty in neo-colonial countries has also been mentioned by many authors (Zulu, 1994; Colle, 2006; IDRC, 2006c; i4Da, 2006). Jimba (2003) proposes that developments in the application of information and communication technologies are the principal pillars upon which the change from an industrial age to an information society rests, which is validated by Benjamin (2006) who confirms that just like developments in computer and telecommunications, information and communication technology have pushed information into the forefront of business, they can similarly contribute to social and economic development. It is important to note that, consistent with Benjamin (2006) on the developments in information and communication technologies, Obijifor (2010) points out that with the evolution of information and communication technology, global communication has become increasingly easy, faster, clearer and more effective.

The important role of information and communication technologies in conveying information that leads to knowledge was discussed in this Section which leads to the question whether the services that these information and communication technologies could render to the developing communities, could assist these communities in their development process, which will be discussed in the next Section.

2.2.2.2 Services regarding developing economies

Several services provided by the information and communication technologies and the resources necessary to support a developing community towards becoming an information society will be discussed in this Section.

Schech (2002) urges that if knowledge acquired from information is the most important factor in a developing economy it could be added that the basic ingredient responsible for the world's current information and communication technology revolution is that these information and communication technologies enable peoples to communicate in order to reduce social and economic problems. Schech (2002) adds that information, made available by means of communication, is one aspect of development which is characteristic of the stream of technological innovation under way – information is the object of technological discoveries, as well as their application. James and Ziebell (2003:45) also add that there is a growing enthusiasm in the development community regarding the potential for

contemporary information and communication technologies to "alleviate some of the social and economic problems" of the developing world. Jimba (2003) agrees and advises that accessing information and communication technology-carried information requires a lot of overt resources, including a telecommunications infrastructure to provide network access and an electrical infrastructure to make the information and communication technology work. Most rural information and communication technology projects battery back-ups and Universal Power Supplies (UPS) are mandatory, as well as "a skills infrastructure to keep all the information and communication technology working; money to buy or access the information and communication technology; usage skills to use the information and communication technology; and literacy skills to read the content", advises Heeks (2004:7). Castells' observation (1985:1) that we are in the middle of a "major technological revolution that is transforming our ways of producing, consuming, organizing, living and dying" is only true when the six resources named by Heeks are present (2004). When these preconditions exist, information and communication technology has the power to generate communication which leads to the achievement of disseminating and establishing information that could lead to development and consequently empowerment.

This Section debated on the services of the information and communication technologies to the developing communities and the necessities therefore such as an appropriate and suitable infrastructure. With an effective and useful infrastructure the information and communication technologies have the capacity to lead struggling economies to become liberated and emancipated. This ability and potential power of the information and communication technologies will be discussed in the next Section.

2.2.2.3 Capacity of information and communication technologies

This Section will deliberate on information and communication technologies which could become mechanisms to link developing communities to the information super-highway in order to network globally.

Regarding this capacity of the information and communication technologies, Van Audenhove (2001) believes that information and communication technology mainly has a positive impact on social change and economic development, as information and communication technologies support productivity and improve the quality of the life of people because it enables access to information – they can become sources of empowerment and emancipation (Schech, 2002) to a developing community, as they are the tools through which information can be established and disseminated which means that the developing community is linked to the information super-highway. This connection to the information super-highway is defined by Onuora-Oguno (2010:229) as "when available goods and

services, or social and cultural influences, gradually become similar in all parts of the world". Onuora-Oguno (2010) continues and explains that the impact of this globalisation is increasing global integration and changing the way societies interact with each other. This globalisation through connecting a developing community to the information super-highway has multiple advantages to the benefit of the community.

This Section deliberated on the globalisation that could be obtained by a developing community by means of the information and communication technologies. Supporting this view are organisations such as the World Summit on the Information Society that bodes positively for powerful economic and social development. The views and Action Lines of this WSIS will be explained in the next Section.

2.2.2.4 World Summit on the Information Society

An explanation of the WSIS and its role in promoting social change will be described in this Section.

Colle (2011c) is of the opinion that the World Summit on the Information Society (WSIS) has underscored the role of information and communication technologies in promoting social change and especially for helping meet the Millennium Development Goals (MDGs). Colle (2011c) discloses, though, agreeing with Badimo (2005), that it was revealed during the WSIS that information and communication technology bodes well for powerful economic and social development. The WSIS presented a vision of Connecting the World wherein 800 000 villages across the continents would have digital access by 2015. This means that information and communication technology not only holds the promise for development, but it has already been instrumental in the development process (UN Technology Task Force, 2003). By connecting the developing communities to the information super-highway, information and communication technologies open doors to disadvantaged communities regarding tele-medicine, tele-schooling and every other linkage the Internet offers (Van Audenhove, 2001). Dahms (2001) supports Van Audenhove (2001) on the advantages of information and communication technologies and advocates that the skill to use and access information and communication technology, especially the Internet, offers great advantages in areas such as education (tele-schooling), health, the marketing of commercial products and more, as mentioned above.

With an explanation of the WSIS with reference to its vision of Connecting the World to connect thousands of villages globally with digital access by 2015, the next Section will reflect on information and communication technologies in work-related organisations.

2.2.2.5 Information and communication technologies in work-related organizations

This Section will debate on integrating the world economy through information and communication technologies.

By means of information and communication technology, the developing community can also communicate with other work-related organisations. Already in 1998 Castells (1998) forecasted that information and communication technology has also created a new context for development, e.g. as a result of the interlinking of developing communities, the economies of different countries are being transformed into a single global economy, forecasting Onuora-Oguno's (2010) view of referring to this movement as globalisation. Kiplang'at (2004) agrees with Castells (1998) and Onuora-Oguno (2010) on the subject of globalisation and advises that because the world economy is being integrated through information and communication technology, development policies need to be rethought to help developing countries connect to the information super-highway of the world economy. In 2010 Lekoko (2010:53) also confirms that "using information and communication technologies for cultural globalization is about thinking deep of the benefits to be derived from their use, especially by the indigenous communities themselves". Regarding access to the information and communication technologies, Omolo (2004) cautions that there is, however, an increasing division between those people who have access to these telecommunications and the information they contain, (the information "haves") and the many people who do not (the information "have-nots"). Regarding infrastructure for an Information Society, Van Audenhove (2001:80) noted "… een groeiende kloof tussen de minst ontwikkelde landen en hoog ontwikkelde landen". This phenomenon has been referred to by several authors as the "digital divide" (Ndeta 2003:97; Benjamin & Dahms, 2004; ITU, 2004; Omolo, 2004:1).

While defining the information and communication technologies with reference to its services and capacity which is also promoted by the WSIS, the role of these information and communication technologies in development regarding its capacity and pivotal role specifically in the agricultural sector, will be explained in the next Section.

2.3. INFORMATION AND COMMUNICATION TECHNOLOGIES AND DEVELOPMENT

The important role that information and communication technologies play in the development process of communities will be explored in this Section, with specific reference to positive and negative views regarding the role of information and communication technologies in the agricultural sector.

Telecommunications undertaken throughout centuries proved that development has always been powered to enable people's need to communicate, i.e. reliably transmit an ever increasing amount of information across increasing distances – which lead to the "landscape of telecommunication being characterized by a large variety of technologies, offering various ways to connect users with other users or with application servers", remark Fortuna and Mohorcic (2009:1363). Fortuna and Mohorcic (2009) add that the area of information and communication technologies is one of the fastest changing areas and that related services and applications have an enormous and almost immediate impact on diverse aspects of the modern society, including inter-human relations, economy, education and entertainment. Global communication is the process of transmitting and receiving information on a world-wide scale by means of information and communication technologies through cyberspace (Lubbers & Koorevaar, 2000). Ekeanyanwu (2005) agrees with theorists (Lubbers & Koorevaar, 2000) on global communication and notes that through global communication global news and information could be gathered, disseminated, interpreted and analysed, with special reference to develop and improve of the lives of peoples in developing countries. The ability, though, to effectively address sustainability concerns, will depend on the portfolio of investments in information and communication technologies. Rao (2009) agrees with the above aspects and is of the opinion that these strategies could permit access to a wide variety of spatial information about conditions and impacts on natural resources, production systems and the socio-economic profile of the region in question. The characteristics, applicability and usages of these information and communication technologies are described and explained below.

While the important role of information and communication technologies in the development process was explained in this Section, the next Section will debate on the various applications and characteristics identified regarding these information and communication technologies.

2.3.1 Characteristics, applicability and usages of information and communication technologies

This Section will discuss the applicability and the interactive role of information and communication technologies in the development process as such, as well as the agricultural sector with sub-sections explaining the central and major role of information and communication technologies, information and communication technologies in the agricultural sector and the role of information and communication technologies in the development process.

Many an author and researcher (Lubbers & Koorevaar, 2000; Greenidge, 2004; Heeks, 2004; USAID, 2004; Ekeanyanwu, 2005; Adinarayana *et al.,* 2008; Rao, 2009) has defined and described these information and communication technologies, and almost as many – if not even more – different definitions were expressed and voiced. Rao (2009) mentions that information and communication technology is a range of technologies that integrate information technology devices such as personal computers, with communication technologies such as telephones and telecommunication networks. Adinarayana *et al*. (2008) agree with this integration of information and communication technologies and emphasise that the information and communication technology has demonstrated its effectiveness as a tool for information gathering and dissemination in decision-making processes for rural development. Overall, these information and communication technologies could be classified as a "combination of hardware and software" (USAID, 2004:3) enabling a huge list of methods – identified by various researchers – such as the storing, managing, processing, assessing, accessing and communicating of information (Greenidge, 2004; Heeks, 2004; USAID, 2004). What could be added to this list is that the information and communication technologies have the means of creating information. These information and communication technologies could also be divided into the older (radio, television, fax, etc.) and the newer information and communication technologies (Internet etc.) add Schech (2002); Greenidge (2004) and the ITU (2004). USAID (2004) identifies and points out the following four characteristics of information and communication technologies:

- "Interactivity" – information and communication technologies are effective two-way communication information and communication technologies;
- "Permanent availability" – information and communication technologies are available 24 hours a day;
- "Global reach" – geographic distances hardly matter any more, except in poor rural communities without ICT; and
- "Reduced costs for many" – relative costs of communication have shrunk to a fraction of previous values (Gerster and Zimmerman, 2003:9).

The challenge for those working in information and communication technologies is to define which roles the information and communication technologies can play and where these information and communication technologies could be applied effectively, including also what they cannot do (O'Farrell & Norrish, 1999; Shah *et al.,* 2002; Van der Merwe, 2007). But the pivotal role of these information and communication technologies will be not only to generate and create communication by means of which the rural small-scale farmers would be able to converse and negotiate not only with government and other agriculture-related

organisations, but also to support the socio-economic and ICT needs of a developing community, as deliberated in the following Section.

2.3.1.1 Pivotal role of information and communication technologies

But could these information and communicate technologies assist rural, developing communities? The answer is "yes", since Agunga (1998), IDRC (2006c), Colle (2006) and i4d (2006b) confirm that these information and communication technologies could play a pivotal role in bringing information not only to developing communities, but to developing countries as such. For explanatory purposes, note Figure 3.1 in Chapter 3, where access to and application of information and communication technology ultimately progresses into development. Although Castells (1985) mentions that information and communication technologies disseminate information and knowledge in a way that is potentially more and more decentralised and individualised, the lack of knowledge as such, in developing countries, has been identified and mentioned by many authors (Zulu, 1994; Colle, 2006; IDRC, 2006c; i4d, 2006b). Agunga (1998:35) notes that the solution to the lack of knowledge and information in the developing countries, could be ascribed to the fact that "sustainable development has to do with the spreading of knowledge and insight", which could be supported and encouraged by communication, made available by means of the implementation of information and communication technologies. Castell's (1985) most important quote that the information and communication technologies "give the poor a voice", has been echoed by various researchers including Heeks (1995) and the ITU (2004). Several other researchers (Cecchini & Scott, 2004; Gertster & Zimmerman, 2003) agree and also note that information and communication technologies can enhance poor people's opportunities by improving access to markets, health and education.

Castells (1985:1) and Schech (2002) mention that the basic ingredient responsible for the current global information and communication technology revolution is information as such. Marshall *et al.*, (2003) also note that when addressing the first Global Communities Networks Congress in Barcelona in 1999, Manuel Castells saw the approach of community networking as a basis for globalisation by enabling community processes, which lead to e-health, e-culture, e-government, and e-politics, and not least e-exchange and e-commerce. Lekoko (2010:62) agrees with Marshall *et al.* (2003) on the prospects of information and communication technologies and add that information and communication technologies can "potentially support and authenticate the dissemination of information by globalizing indigenous cultures by ensuring that these cultures are shared and appreciated globally". This discussion leads to Lwoga *et al.* (2010) urging that the dominant approach – which emphasises that people should be central to any technological intervention in knowledge management – to research and extension, still allows for the information and communication

technology approach advocating that knowledge is created by scientists, to be re-packaged and disseminated by extension and to be applied by farmers in the agricultural sector.

2.3.1.2 Information and communication technologies in the agricultural sector

Regarding the agricultural sector, Rao (2007) explains that information and communication technology could effectively leverage its insights into the agricultural value chain and its distribution business into rural areas worldwide, in order to assess the value addition of the information and communication technologies to its food and agribusiness. Assefa *et al.* (2010) agree and point out that there is a huge urge for farmers to have their indigenous knowledge incorporated into knowledge and information systems. This emphasises the global need to obtain, record protect and store the indigenous knowledge of people's to ensure that it could be available for agricultural developmental initiatives. This forms the pillars for the change from an industrial age to an information society, which is also advocated by Jimba (2003). However, to access information and communication technology carried information requires many overt resources. These could include electrical power supply infrastructure (Jimba, 2003); battery back-ups and Uninterrupted Power Supplies (UPS) (Aditya, 2006); a skills infrastructure and literacy skills to read the content (Heeks, 2004).

On the positive side regarding the benefits of information and communication technologies, Van Audenhove (2001) is of the opinion that developing countries now have the opportunity not only to evade the industrial countries, but to directly become complete digital networks. This important view of Van Audenhove (2001) concerning developing countries is supported by Schech (2002:18) who advocates that "it is the exclusion of peoples and territories from the informational mode of development, rather than their dependent integration, which constitutes the problem". ITU (2004) notes that on the web, "indigenous peoples are mobilising and that resistance to dominant discourses is possible: that alternative stories can be told, examined, shared and negotiated". This means that participants of the indigenous cyberspace could use the information and communication technologies to challenge dominant stereotypes and discourses – they could engage in negotiations which could enable resistance activities to be voiced, shared and acknowledged. This is in line with Joseph (2006:103) who proposes that digitisation and computerisation have facilitated the process of "media convergence". Ekeanyanwu (2010) articulates that communication (computerised communication) is part of every medium's operation today and explicit compartmentalisation of various media is a futile exercise. Colle (2011a) also refers to the revolutionary impact of the information and communication technologies and notices that these globalised information and communication technologies affect the way people live, learn and work, as well as the way government interacts with civil society, or, as Colle

(2011c) explains, it comprises the role of information and communication technologies towards sustainable, social and economic development. In addition, initial advantages in technological expertise will strengthen rather than diminish over time.

On the negative side, though, Joseph (2006:32) notes that some indigenous people perceive technologies as "tools for perpetuation of neo-colonialism and the domination of indigenous people". Adding to Joseph's (2006) view regarding indigenous peoples, Raseroka (2008:248) documents the need for the establishment of a "world-wide knowledge society" that accommodates indigenous knowledge systems and explains that the development of information and communication technologies is important as it is a significant tool for the capture of predominantly oral-based indigenous knowledge to facilitate both its preservation and access beyond person-to-person communication.

A number of researchers and theorists (Castells, 1985; Heeks, 1995; Dahms, 2001; North and Swider, 2001; Rose, 2001; Van Audenhove (2001), James & Ziebell (2003:44-46), Benjamin & Dahms (2004), Painting, 2004) are of the opinion that social inequality and polarisation could also be increasing between the information-have communities, which form the information society, on the one hand, and the information have-not communities on the other: It could be deducted that the developed countries will have the advantage and there is a failure to recognise that worldly subordination and relations of power (Schech, 2002) and a tendency to direct the benefits of the information and communication technologies to the already privileged. Supporting Emberg (2001), Schech (2002) remarks that this inequity between the rich and the poor and between urban and rural areas is even more accentuated regarding access to information and data networks, notably the Internet– and that the gap between those who have access to these vital resources and those who have not is widening. James and Ziebell (2003) agree with Emberg (2001) and mention that uses of information and communication technologies by lower-income communities, the marginalized, and the small and micro-businesses are being left largely unattended.

Nevertheless, technological innovation and the appropriate implementation of new information and communication technologies form a fundamental part of the development process, and Heeks (1995:9) comments that "where innovations, (or interventions as Crosby *et al.* (2000), refer to it, are few and where few skills exist to implement new information and communication technology, development suffers", as argued below in the next Section.

2.3.1.3 Information and communication technologies in the development process

It could be concluded that problems regarding development can be solved by these technological innovations. It is therefore important that a viable method be created in order

to engage information and communication technologies to the peoples to be able to communicate – regarding socio-economic and ICT as well as agriculture-related aspects. Badimo (2005) is of the opinion that information and communication technology bodes well for gaining knowledge and the UN Technology Task Force (2003) concludes that information and communication technology not only holds the promise for development, but that it has already been instrumental in the development process. Joseph (2006) agrees with this promise of development advocated by the UN Technology Task Force (2003) and notes that the globalised world is entering a new phase where more people than ever before are going to have access to information and communication technology facilities as innovators, collaborators and even as terrorists, while Friedman (2005:33) argues that where-ever one turns to, hierarchies are being challenged from below or transforming themselves from top-down structures into more “horizontal and collaborative entities”.

This also means that information and communication technology has created a new context for development, e.g. as a result of the interlinking of developing communities: The economics of different countries are being transformed into a single global economy, also referred to as globalisation. In order to successfully employ these technology telecommunications (infrastructure), Parker and Hudson (1995) as well as Badimo (2005) believe that an information and communication technology network of infrastructure should be deployed. The question then arises regarding the role of not only infrastructure, but also infostructure and access in the development process.

Jimba (2003), though, cautions that the emphasis should also fall on the information itself – the infostructure – how the information is packaged, the language presented, etc. Van Audenhove (2001) is also of the opinion that the underlying communication infrastructure as well as the access thereof, could lead to an information society. This view then also leads to the founding of the Global Information Infrastucture (Van Audenhove, 2001; Rogers, 2006). In order to give a contextual framework, a comparison of the usage of the various information and communication technologies is presented in Tables 2.2 to 2.4 (World Bank, 2009). These Tables confirm the view of Van Audenhove (2001) that telecommunication networks are much less available in developing countries than in developed countries, verifying the view of the World Bank that the developing economies lack basic infrastructure of information and communication technologies.

By studying and analysing information and communication technologies, it is not only essential, but crucial to note the influence of these information and communication technologies on the digital divide as well as the digital divide as a consequence of these information and communication technologies. The digital divide – or information divide as this divide is called by Castells (1985) – is perceived as the increasing imbalance in the

access to and usage of information and communication technologies (infrastructure) – between the privileged (information rich; haves of information; information society) and underprivileged (information poor, or have-nots of information) social groups (Castells, 1985; Heeks, 1995; Dahms, 2001; North & Swider, 2001; Rose, 2001; Benjamin & Dahms, 2004; Painting, 2004). Regarding this digital divide, Castells (1998) and Benjamin (2001) add that the question of the ability of these indigenous communities as such, to use and benefit from the information and communication technologies, as well as the applicability of the information (infostructure) obtained from these information and communication technologies, form part of the digital divide. This digital divide has been noticed, researched and warned against by many researchers and theorists (Schiller, 1996; Van Audenhove, 2001; Schech, 2002; Shariffadeen, 2003; Omolo, 2004). According to Ekeanyanwu (2010:4) indigenous communities, or underprivileged communities, have "not benefitted much from the information society" and Lwoga *et al.* (2010) propose that while developments in information and communication technologies have enabled access to indigenous knowledge, the digital divide is still prevalent. It could be said that the people living in rural locations of many countries are also excluded from participating in the world that is changing due to the use of information and communication technologies (Okeke, 2010). These rural, developing peoples are situated in developed countries as developing communities as well as in developing countries as such. But the question is whether this digital divide can be bridged, since during the Information Society and Development Conference in 1999, it became clear that the "needs of the developing countries and the developed countries are not always the same" (Van Audenhove, 2001:115). In addition, researchers and theorists (Castells, 1985; Rose, 2001; Benjamin & Dahms, 2004; Painting, 2004) also mention that, especially in Africa, the vast majority of the population has neither access, nor the training or skills, to use the information and communication technologies. Even though the impact of information and communication technologies on political, social and cultural aspects has never been queried (Heeks, 1995; Van Audenhove, 2001; Kiplang'at, 2004; ITU, 2007a) it is deemed that there is increasing evidence that access to information and communication technologies could have a direct impact on the social and economic empowerment of rural people – could these indigenous peoples be transformed from recipients of technological know-how to productive users? This is with special reference to small-scale irrigation schemes in South Africa, where the information super-highway does not reach the large number of peoples in these rural, isolated areas – as the availability of information and communication technologies is concentrated in the larger cities (Painting, 2004; Statistics South Africa, 2006). Regarding Africa, Naidoo (2007) also cautions that the vast majority of Africa's population live in rural areas and that bridging the digital divide is an imperative. Referring to the people in rural areas (Naidoo, 2007) it could be said that although information and

communication technologies is not affordable by most rural people at small-scale irrigation schemes in South Africa, Schech (2002:17) concludes that by means of the Internet, developing communities and NGO's can obtain access to "resources and information anywhere in the world" – since the application of these information and communication technologies offers the acquisition and absorption of knowledge, offering the exchange, access and management of information to developing countries in order to bridge the digital divide (Castells, 1985; Heeks, 1995; Benjamin & Dahms, 2004; Gerster & Zimmerman, 2003; Heeks, 2004). With the making of applicable information and communication technologies available to the rural, farming community, the advantages and benefits are unprecedented. Besides the challenge for telecommunications in rural and remote areas, the introduction of telecommunications in rural areas has little meaning if the people have no use for such mechanisms (Ernberg, 2006). This means that initiating telecommunications into rural areas must form a collaborative effort by all sectors involved in developing a rural community. Ernberg (2006:10) mentions that this effort could be achieved by means of:

- "Supporting and diversifying local economic activities (promoting co-operatives);
- "Improving social conditions (e.g. health care, social security etc.); and
- "Improving access to education and culture".

Regarding the development of a rural community, Kiplang'at's (2004) findings from studies analysed indicate that some information and communication technology initiatives showed a substantial impact on bridging the digital divide and that lessons learnt from these findings include that:

- Information and communication technology initiatives should be clear about their development goals and their impact on the community;
- Information and communication technology ventures should be sensitive to local conditions and limitations and information and communication technology employed should be affordable and accessible, easy to use and maintain; and
- Interests and goals of the stakeholders should be aligned with the goals of the intervention.

The above Sub-sections considered the applicability and the collaborating role of information and communication technologies in the development process as well as regarding the agricultural sector. This subsequently leads to the Sub-section reviewing the influence of funding on the availability of information and communication technologies.

2.3.1.4 Information and communication technologies and funding

Regarding affordability, funding might be a key problem in bridging the digital divide, as donor funding comprises mostly once-off grants where rural communities cannot afford information and communication technologies, and also because these grants are discontinued after the establishment of interventions such as telecentres. Regarding funding, it is thus necessary to note that enough funds should be obtained by these rural farmers in order to purchase the appropriate information and communication technologies to be able to communicate. But in addition to this problem, Gurstein (2003) notes that at local level, some of the funding resources for information and communication equipment are being directed away from rural communities and centre towards supporting the development of citywide community networking. This view of Gurstein (2003) is important as it is in line with that of several researchers (Kiplang'at, 2004; Painting, 2004; Fuchs, 2006; Colle, 2011b) who note that officials might be facing the dilemma of competition for scarce financial resources.

The above discussion showed the various researchers' views on whether the information and communication technologies could, or could not, assist and facilitate development in rural, developing communities.

After discussing the role of information and communication technologies in development, attention is correspondingly drawn to the role of these information and communication technologies in the digital divide. This digital divide, the division between the 'haves' and the 'have-nots' of information and communication technology will be discussed in the next Section.

2.3.2. The digital divide

The digital divide, as seen as the divide between those who have access to information and those who do not have access to information that could lead to development as well as the important role of these information and communication technologies in the digital divide, will be explained in this Section. Sub-sections will furthermore explain when this digital divide was discovered and identified as well as the effect regarding the distribution of information and communication technologies on the digital divide.

Schiller (1996:59) explains that the digital divide is the division between those who have access to information and communication technology (the information rich; the information society or the "haves") and those who do not have access to information and communication technology (the information poor or the "have-nots"). Regarding access to cyberspace, Rubinoff (2005) upholds the view that the term digital divide is not only generally used to explain the circumstances and situations regarding the access to cyberspace, but it also

over simplifies the difficulties of access to information and communication technology for the peoples within developing countries. When examining the economics of the digital divide the first issue that comes to mind is "the gap between those who have access to information technology and those who do not" (Ndeta, 2003:84).

The digital divide is also called the "knowledge gap" between developing countries and their richer counterparts (Schech, 2002:14). Omolo (2004) adds that the Food and Agricultural Organisation (FAO) uses the term to refer to the inequitable access to information and communication technology both between wealthy and poor countries, and within all countries, between relatively privileged and underprivileged social groups and declares that there are, indeed, many definitions of the term 'digital divide' (Omolo, 2004). It could be proposed then that there are as many definitions and explanations regarding the digital divide as there are theorists and researchers researching the various applications and attributes, as well as the causes and effects, of the digital divide (Schiller, 1996:59; Schech, 2002:14; Omolo, 2004; Rubinoff, 2005). Information and communication technologies have been revealed as key potential factors for economic growth, social development, and cohesion (Billon *et al*., 2009). Because information and communication technology diffusion drives access to information and knowledge, this uneven distribution of information and communication technology between developed and developing countries has a very different impact on economic development, and therefore on wealth and affluence. Another view of the digital divide is that it is seen as unequal access to information and knowledge as well as unequal capacity to use information and knowledge for development (Shariffadeen, 2003). This gap between the "haves" and the "have-nots" in terms of information and communication technology is real and does exist between countries as well as within countries, between the elite and the poor (Dahms, 2001; Rose, 2001; Painting, 2004). It is, however, not only a gap caused by a lack of information and knowledge,, but also a gap caused by the lack of global infrastructure, sufficient finances and literacy skills in order to make the information and knowledge of the poor globally explicit and communicable. Dahms (2001) therefore strongly supports the view of Heeks (2004:1) that the use of information and communication technology is for giving the "poor a voice", (Heeks, 2004:1) and to make the poor active information providers rather than passive data recipients in this age of global information capitalism.

Kiplang'at (2004) and Tas (2010) urge though, that the problem goes deeper, because at its core the problem is one of economics. When scrutinising the digital divide on any level, this is what is generally meant: The peoples who are on the side of the divide without technology do not choose to be there, but are on this 'have-not' side because they lack the resources and processes which could assist them to gain access to technology (Billon *et al*.,

2009). For instance, referring to South Africa as a developing country, with the withdrawal of all government aid from the homelands in 1996, the irrigation schemes have become dilapidated (Lahiff 2000; Stimie *et al*., 2001; Shah *et al.,* 2002; Van Averbeke**,** 2006). But the problem regarding economics affects peoples not only in South Africa, but many people in the developing countries of the world. The digital divide affects both those in urban centres, and those in rural areas. One of the main issues with the digital divide is that it not only prevents individuals from certain underprivileged groups from succeeding, but it can even make the situation for certain groups and even entire classes even worse (Rao, 2008; Alibaygi *et al.,* 2011). As a matter of fact, there are theorists such as Heeks (1995) and Schiller (1996:57) who fear that the failure to address the digital divide will likely "aggravate current levels of poverty and isolation and increase the already large gaps in education and access to opportunity between historically privileged and historically disenfranchised groups". This is therefore not only a current dilemma, and if this dilemma is not addressed, the digital divide is also a problem that could greatly effect the future of many countries, if they do not take the domestic digital divide issue seriously – the so-called digital divide has become an extremely important issue for many international organisations (FAO, 2006a; FAO, 2006b; ITU 2007b; World Bank, 2009) and a "fruitful research topic", conclude Billon *et al.* (2009:599). But how this digital divide was detected and recognised will be explained below in the next Sub-sections.

2.3.2.1 Discovering and identification of the digital divide

But when and how was this present-day dilemma identified? It was in 1989 that the United Nations Development Programme (UNDP) warned against this increasing imbalance in the use of information and communication technology between the developing and the developed countries (Schiller, 1996). The resultant report of the UNDP warns against the increasing inequality in the economic, political, social as well as cultural sectors and these discussions led to the inception of the term "digital divide" (Schiller, 1996). The important view of Schiller (1996) regarding this inequality is supported by Van Audenhove (2001:121) who voices that the infrastructure needed for information and communication technology favours the developed countries and "makes it difficult for the developing countries to use information and communication technologies and their applicability for development". According to Van Audenhove (2001) the UNDP and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) have, during the 1990s, in a political discussion on the information society, pleaded for more technological capacity in the developing countries. In 2011 Colle (2011b) also cautions and emphasizes the importance of bringing the disadvantaged and marginalised people across the digital divide – or as the G8 said more than a decade ago, to establish the principle of inclusion, where everyone

everywhere should be enabled to participate in and no one should be excluded from the benefits of the global information society.

2.3.2.2 Influence of the distribution of information and communication technologies on the digital divide

The disadvantaged and marginalised people from the developing countries, though, experience fundamental problems in their efforts to bridge the digital divide. Rubinoff (2005) identifies that aspects such as access, assessment, management and utilisation of telephony and electricity in developing countries should be analysed in more detail in order to determine their specific information and communication needs to be able to provide the necessary support, including the training that allows people to envisage how information and communication technologies might be used for development. Shariffadeen (2003) agrees on this subject of the utilisation of the information and communication technologies, and adds that the digital divide is therefore not purely technological and infrastructural but it also refers to the lack of capacity to utilise and apply information and communication technology (infostructure). Seo *et al.,* (2009) also explain that as a result of the digital divide, the gap is becoming wider between the countries that are able to take advantage of the economic opportunities provided by this new technology, and those that cannot, perhaps due to *inter alia* lack of funding, lack of knowledge or lack of location far from infrastructure backbone. For example, countries such as the USA, Finland and Ireland, which have recognised and grasped the benefits of these potentials in the 1990's have resulted in notable economic growth and job creation when compared with other European countries and Japan (Seo *et al.,* 2009). Billon *et al.* (2009) agree with Seo *et al.* (2009) and mentions that this digital divide has been a topic of major concern for many international organizations during the last 15 years Billon *et al.* (2009) explains that although developing economies (middle and low income) have increased information and communication technology access and use, the gap between income groups still remains remarkable and varies according to the usage of the specific type of technology, with newer technologies (such as broadband Internet) being the most unequally distributed.

This uneven distribution of availability, access and use of the information and communication technologies alone do not constitute the digital divide, but the ability to use information and communication technology as well as the applicability of the information, are also critical factors in generating and accessing wealth and knowledge (Castells, 1998). Information and communication technology is of little use if its utilisation and application is not fully understood. Already in 1995, Heeks (1995) advocated that it is taken for granted that information and communication technologies hold the key to development, and also that the real "barriers to information and communication technology (that) flows between the North

and South are lack of finance, information, skills and institutional capacity" (Heeks, 1995:196). Van Audenhove (2001) supports this view and mentions that although information and communication technology and its positive impact on "political, social and cultural aspects are never questioned" (Van Audenhove, 2001:136), investment in information and communication technology may bridge the gap between the North and the South as the use of information and communication technologies could lead to social and economic change and development. Marshall *et al.* (2003, xi) support this view and uphold the fact that information and communication technology is a "tool for reconnecting people: with people, with themselves, with economic opportunity, with educational opportunity, with their locality, and with their culture, helping people to give voice to their identity." Van Audenhove (2001) cautions, though, that connecting people could only be seen as factual, provided that the application of information and communication technologies implies more than just information and communication technology transfer.

It could be derived that change, therefore, does not depend exclusively on technological transfer, as it also involves the information that could be obtained from information and communication technologies. With the ability to communicate not only via fax, e-mail and telephone or the mobile phone, but via Internet as well with its wide arrangement of applications, the developing countries could bridge the digital divide and become linked to the information super-highway. Local content, the applicability and the availability thereof to the local people has been debated by various researchers such as Raslan (2006) and Onuara-Oguno (2010). Although not always affordable by especially the rural, developing communities at small-scale irrigation schemes in South Africa, the application of information and communication technologies could lead to the revitalisation of these schemes, with Marshall *et al*. (2003) cautioning that few developing communities have the required support infrastructure for network design, hardware maintenance, software support and professional training.

Having identified and described the digital divide as the imbalance between access to and the lack of the expertise to use information and communication technologies, as well as the importance of local content, the question how this digital divide can be bridged, remains. There are many initiatives as well as opinions of researchers on how to address and bridge the digital divide. This will be discussed in the next Section.

2.3.3. Bridging the digital divide

This Section will explore whether this digital divide could be bridged with sub-sections on the functions of information and communication technologies in bridging the digital divide as well as on the support and backing of the World Bank in this regard.

At the Information Society and Development (ISAD) conference, held in South Africa from 13 to 15 May 1996, the digital divide was discussed and it became clear that the "needs of the developing countries and the developed countries are not always the same" (Van Audenhove, 2001:115). This important view about the contrast in needs of the developing and the developed communities, is supported by Kasemsuk (2011) from Bangkok who adds that the needs of a community should be heard and identified, and that transformation of messages should be according to the different levels of knowledge of members. Shearman (2003) agrees and mentions that information and communication technologies could, by providing the necessary information that could address these needs, act as catalysts for the reconnection and transformation of developing communities in a social, economic and cultural sense. Shearman (2003:15) urges that it is therefore important to note that not only should the developing communities engage with and benefit from the information and knowledge economy, but also "develop their capacity to generate and tap into the creativity that is fundamental to much economic and urban renewal". This view on the community to engage and benefit from the information and communication technologies is consistent with that held by James and Ziebel (2003) as well as Ndeta (2003) who suggest that in order to bring information and communication technologies closer to the developing community's needs, problems, fears and aspirations, the communities themselves, under guidance of their traditional leaders, should take a leading role in the application of information and communication technologies and propose that only then information and communication technologies could path the way for development. This view is also confirmed by the Economic Commission for Europe (ECE) (General Assembly, 2012) which believes that the digital divide has become the largest and fastest-growing divide in the world, and that initiatives by multilateral agencies are needed to help developing economies to make long-term information and communication technology development plans, especially for broadband networks (General Assembly, 2012).

The information and communication technology networks (infrastructure) are discussed, but what about the infostructure of a developing community – its cultural aspects such as language, literacy, etc.? In 2001, Van Audenhove (2001) pointed out that the developing countries not only argue that they need equal access to information and communication technology and at an equivalent cost to that of the developed countries, but also that their languages and cultures should be taken into consideration. The Submission on Strategic Planning of UNESCO (2012) states that UNESCO is committed to building inclusive knowledge societies through information and communication. This means that the complete cultural facet should be brought into the discussion on the discourse of linking developing communities to the information super-highway. Communicating with these developing

communities will then evolve around the basic set of principles describing the discipline of Communication for Development (WCCD, 2007). Communication for Development is seen by WCCD (2007) as follows:

- Is about people and the process needed to facilitate their sharing of knowledge and perception; to support developmental change;
- Is based on dialogue which supports participation;
- Follows the two-way, horizontal communication model;
- Gives voice to those most affected by the development issues at stake;
- Recognises that reality is largely a social construct;
- Is contextual, addressing cultural, social and economic issues; and,
- Uses a number of tools, techniques, media and methods that support mutual understanding.

It might have been proven to a large extent that access to the broad range of information offered by means of the huge capacity of the information and communication technologies could lead to development (Castells, 1985:1; Heeks; 2004:7) of not only a community, but of a developing country as such. But this now leads to the question how, by whom and by means of which information and communication technologies could these developing procedures and actions be undertaken?

The first information and communication technology to be discussed is the telephone, as it is the most basic of all information and communication technologies, the most affordable and most used in the rural areas. According to the General Assembly (2012) developing countries are catching up with the developed countries in mobile and fixed line telephony. On this topic of the telephone, Quadir (2010) reminds that since mobile phones are in effect hand-held computers – approaching the tasks of traditional computers. With such powerful mechanisms in the hands of millions, entrepreneurs will continue to capitalise on their versatility in order to build new businesses on existing and evolving information and communication technology – with or without Internet access.

Quadir (2010) notes that the initiation and introduction of broadband access in poor countries – enabling communication through Internet possible without depending on the mobile network – will surely lead to mobile innovations and entrepreneurial undertakings. Over the past decade, the World Bank Group (WBG) has supported the information and communication technology reform agenda in more than 85 countries with a strong focus on 65 low-income countries. Thus far, says Xia (2010) from China, in addition to expanding the

telephone and television services in rural areas, the numbers of agriculture-related websites and e-commerce portals, township government websites, and information service stations have also been increased. Although Gurstein (2003) has pointed out that funding for the information and communication technologies in developing communities usually poses to be problematic, Ramaswamy (2011:41) is of the opinion that the support of the Development Bank has played a significant role in helping to "liberalize telecommunications markets, privatize incumbent operators, revamp regulatory frameworks, and build capacity." In 2011 Alozie *et al.* (2011) observed that although pre-paid systems initially extended services to people who were willing and able to pay the fixed costs of a handset and phone number, these services have since plunged to the point that virtually anyone can now afford cellular phone service.

2.3.3.1 Application of information and communication technologies in bridging the digital divide

With the prospect of these initiatives in the sphere of information and communication technologies, the application of these information and communication technologies should be examined. Schech (2002) proposes that information and communication technologies offer infinite possibilities to disseminate information for development to developing countries. In addition, information and communication technologies can enhance the well-being of these resource-poor peoples by improving their access to information and communication technologies (Attwood *et al.,* 2013) and by "opening up new income opportunities for the poor and improving governance through sharing knowledge among institutions, governments and think tanks" (Schech, 2002:14). Regarding the application of information and communication technologies, Marshall *et al.* (2003) supports the view of Schech (2002) and add that regarding governance, the information and communication technologies are emerging as a tool for enabling the development and enhancing the effectiveness of local leadership and also confirm that the information and communication technologies provide the means to create collaborative networks of economic, social and political initiatives particularly for local responses to externally imposed change in the development process. But Benjamin and Dahms (2004) caution that information and communication technologies are not widely available in the developing countries, and the people that must choose, use, adapt and implement such information and communication technologies are sparse. Taking Africa as an example, Benjamin and Dahms (2004) remark that Africa is home to a fraction of all broadband subscribers, and many African countries have not yet launched Internet services. With the support, cooperation and collaboration of initiatives from the industrialised or developed communities, the developing countries could be linked to the information super-highway. Benjamin and Dahms (2004) substantiate their view by stating that these

developing countries will then be exposed to information that could assist these developing countries to be transformed into the so-called 'information rich' (Benjamin & Dahms, 2004).

Gurstein (2003) cautions that the absence of funds or attention to social experimentation with and development of the information and communication technologies will surely be seen as one of the more seriously misdirecting impacts of the market ascendancy. Painting (2004) mentions that in Africa, donor funding is sometimes available in the form of once-off grants to acquire a computer or some other information and communication technology, but grants are seldom available for the monthly payments to an Internet service provider, which is often beyond the means of a poor rural community. Kiplang'at (2004) and Fuchs (2006) agree on this aspect of funding and remark that donor agencies typically reduce or discontinue financial support for telecentres, based on information and communication technologies (Everett and Shukla, 2001), after an initial incubation period. In South Africa the information super-highway is out of the reach of a large proportion of the population and in addition Painting (2004) warns that the greatest concentration of information and communication technology is in the cities, as are the users, with very limited diffusion of telecommunication networks to rural areas because of a lack of infrastructure and a supportive environment.

2.3.3.2 Contributions by the World Bank to bridge the digital divide

On contributions from the World Bank, one could say that there are global initiatives which promote and encourage support to the developing countries, for example: The General Assembly (2012) refers to and points out that the several countries which have implemented deep sector reforms supported by the World Bank Group (WBG) have attracted over US$100 billion in investment between 1997 and 2008. The annual revenue generated by the information and communication technology sector in low-income countries which have been liberalised is equivalent to around 4 percent of their Gross Domestic Product (GDP). When indirect benefits are accounted for, the contribution of the information and communication technology sector to its GDP growth has exceeded 10 percent in ratio in some countries.

The World Bank has also assisted and supported to extend and improve the modernising and restructuring strategy beyond the telecommunications sector to the entire information and communication technology sector (General Assembly, 2012) – including the e-government applications, and has continued its limited support to postal sector reform in 15 low-income countries. Quadir (2010) supports this view of the General Assembly (2012) by proposing that the World Bank's Information 24 Development Outreach Internet protocol on the mobile network will without doubt give rise to another wave of mobile innovations and

entrepreneurial ventures in developing countries who are not linked to the information super-highway – the 'have-nots' of information.

Rose mentioned in 2001 that the technical revolution can transform these rural and remote economies and societies into information economies and information societies (Rose, 2001). In the countries of the South, especially Africa, the vast majority of the population has no access to new information and communication technology, or the training, or skills, to use it, disclose a number of theorists (Castells, 1985; Benjamin & Dahms, 2004; Painting, 2004). It could be added here that developing countries like South Africa do indeed make huge efforts to bridge the digital divide, as R300 million was spent on broadcasting and telecommunications by July 2009 (South Africa, 2009).

The digital divide and whether this divide could be bridged, was discussed in this Section. This leads to the role that information and communication technology plays in creating the digital divide, and also the role of this information and communication technology in bridging the digital divide, which will be discussed in the next Section.

2.3.4. The role of information and communication technologies in the digital divide

This Section will entail a discussion on the part and functions of the information and communication technologies in bridging the digital divide with sub-sections on the conditions; as well as prerequisites and constraints faced by the information and communication technologies in order to be able to bridge the digital divide; initiatives supporting information and communication technologies in bridging the digital divide; and how to preserve and maintain culture in bridging the digital divide.

Many researchers and authors (Castells, 1985; Benjamin & Dahms, 2004; Gerster & Zimmerman, 2003; Heeks, 2004; ITU, 2004) explain that the digital divide can be bridged by means of the application of information and communication technologies. Information and communication technologies consist of appliances such as the computer (with or without e-mail and Internet access), radio, television, telephone, cell phone, copier, scanner, printer and the fax. The important view of the ITU (2004), is that the type of information and communication technology devices and services that give access to the information society include the radio, television, fixed telephone which is available by means of a landline (*old* information and communication technology), and mobile telephone, personal computer and the Internet which are considered as *new* information and communication technology. This split between old and new is also reflected in statistical availability. Most developing nations tend to use the "older" information and communication technology, while most developed nations focus on the newer ones (ITU, 2004). On the subject of new information and communication technologies, The World Bank (2009) agrees with the ITU (2004) and

acknowledges that new information and communication technologies have the potential for "teaching government and institutions about the poor, for designing programmes that benefit them, and for enhancing their participation and empowerment" (Schech, 2002:17). Schech (2002) continues that by means of the Internet, developing communities and NGOs can obtain access to resources and information anywhere in the world. Shearman (2003) agrees with the ITU (2004) and Schech (2002), and adds that the application of information and communication technologies enables community processes and the achievement of community objectives, including overcoming digital divides both within and among communities.

It could be confirmed then that the next step is to examine how and under what conditions, access to information and communication technology could be made usable and useful to the range of excluded populations and communities and particularly to support local economic development, social justice and political empowerment using the Internet as such. Zhang *et al.* (2009) point out that with the exhilarating development of computing and processing technologies, mobile devices could support mobile multimedia applications such as multimedia streaming, and mobile television with their computation and communication capabilities. However, most existing mobile devices are battery powered and have limited energy resources. Various development intermediaries, including mainstream development institutions like the ITU (2004), the World Bank (2009) and UNESCO (2009b), as well as people-orientated NGOs, are increasingly joining forces to bridge the digital divide, and use the information and communication technology revolution to uplift and empower developing communities. This raises the issue of whether the have-nots of information could benefit from these information and communication technologies – how could these peoples apply information and communication technologies to their benefit?

2.3.4.1 Conditions for making information and communication technologies usable

The next step in evaluating and describing the information and communication technologies is to investigate how and under what conditions, access to and the management of information and communication technology could be made obtainable, accessible and useful to the have-not communities.

Responding to the question on the condition for the usage of information and communication technologies, it could be confirmed that the developing countries could employ the information and communication technologies to their benefit, obtaining information that could lead to the necessary knowledge to assist them in their developing process: By means of these information and communication technologies the poor, or the have-nots (of

information), could be exposed to information that supports development (Schech, 2002; Obijiofor, 2009). The challenge for governments is to ensure the convergence of their initiatives to address the digital divide, add Shariffadeen (2003). "This new ICT greatly facilitates the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formation and execution, and widen the range of opportunities for business and the poor", says Heeks (2004:2). Rao (2007) agrees with Shariffadeen (2003) and Heeks (2004:2) on the opportunities presented by the information and communication technologies and adds that information and communication technologies could play a significant role in combating rural and urban poverty, and fostering sustainable development by creating information-rich societies and supporting livelihoods. Obijiofor (2009:43) confirms this view on alleviating poverty by adding that in general, information and communication technologies are perceived as "major tools" for reviving ailing economies and for assisting developing societies to transform their economies, to overcome problems of poverty and illiteracy, and to improve the quality of life of the people. This means that the solution to bridging the digital divide may lie in deploying information and communication technologies, by means of which information could be exchanged, accessed, assessed and managed (Castells, 1985; Gurstein, 2003; Benjamin & Dahms, 2004; Gerster & Zimmerman, 2003; Heeks, 2004). In his analysis of the implication of information and communication technologies in closing the digital divide, or globalisation, as he refers to the closing of the digital divide, Friedman (2005) states that the 21st century will be remembered for a whole new world of globalization – a global world where the entire world is connected to the information super-highway:

2.3.4.2 Information and communication technologies as prerequisites as well as constraints in bridging the digital divide

Heeks (1995:216) claims that "ICT transfer takes place through three important channels: acquisition of information and communication technology, education and training, and technical assistance". James and Ziebell (2003) add to these guidelines, and caution that in order to become an information society, connected to the information super-highway, there should be an adequate information infrastructure; accessible complements such as electricity, telephone, data and financial services; adequate information and communication technology dispersion and disparities; and a policy to guide owners in the Internet business. In this regard, the ITU (2004) adds that information and communication technologies enable the immediate exchange of information and the delivery of innovative applications, for example in government, commerce, education and health. This confirms the fact that without access to information and communication technologies, many people around the world are still excluded from the information super-highway regarding basic, essential socio-

economic services. These information and communication technologies connect disadvantaged people with societal decision-makers so that their voices may be heard in the agenda-setting process, say Rogers and Shukla (2008). The view of the ITU (2004) is important as the report of the ITU (2004) also upholds that access to information and communication technology is doubtless the most fundamental prerequisite for an inclusive information society. Harris (2003) supports this view on the usage of information and communication technologies for development and concurs as he states that promoting the use of state-of-the-art technologies in community contexts is an important way to build local skills and capacity in key areas such as content development and multimedia literacy – community informatics needs to be linked to community development and economic development. It could then be said that when the appropriate information and communication technology – infrastructure (Parker & Hudson, 1995; Jimba, 2003; Ekeanyanwu & Okeke, 2010; Yanggratoke *et al.,* 2011), as well as infostructure (Castells, 1998; Van Audenhove, 2001; Gomez & Ospina, 2002; Gurstein, 2003; Tarjanne 2003; Udoudo, 2010; Colle, 2011c) – is available, technical assistance should be provided and appropriate training should be given so that the information and communication technologies could be used optimally. This would lead to huge advantages and benefits for the developing community – at a personal as well as at a national and regulative level.

But, on the negative side, it is furthermore necessary to note that it is also these information and communication technologies that create the digital divide (Heeks, 1995; Rubinoff, 2005). The digital divide is based on information and communication technologies – those who have and those who do not have access to these information and communication technologies. But there are, thus, also theorists with reservations about the employment of the information and communication technologies (Heeks, 1995; Rubinoff, 2005:65; Obijiofor, 2009:42): The impact on the social, industrial and agricultural requirements when applying information and communication technologies to improve productivity and the quality of life is not significant yet, as the operators and the "hardware" are simply not available, cautions Heeks in 1995 (Heeks, 1995). Heeks (1995) continues that as a result, the developing countries "rely heavily on imports and on technological capabilities residing in the North, and are unable to adapt the imported information and communication technology". On this impact of the information and communication technologies, Rubinoff (2005:65) also remarks that in Latin America the information and communication technologies for development with the seductive glossy screen of development websites and their contents could conceal a deep will of complicated, contradictory, and downright messy relations among people represented. Nwodu (2007) agrees on this negative role of information and communication technologies in the digital divide and observes that the irony of globalisation which we

assume connects every-one is that it leaves a wider gap between people. Nwodu (2007) also states that while the West, with increasingly political independence, economic independence and cultural independence dictates the time, the South is characterised by poor economy, political instability and cultural dependence. This observation is in consonance with Kivikuru's (1996) a decade earlier, noting that globalisation is only the latest stage of both the European and the USA economic and cultural domination of the rest of the world, starting with colonialism, through imperialism and has now moved to globalisation. Rao (2009) agrees and observes that although information and communication technology has nurtured the swift emergence of a global information society that is changing the way people live, learn, work, and relate, the rural population in India are still living with very poor or no infrastructure such as communication networks, further pushing them to poverty. But, as will be discussed, it is therefore the provision of information and communication technology (old and new) to these have-nots of information and communication technologies that is advocated to bridge the digital divide.

This means that on the one hand the information and communication technologies for development hold enormous developmental potential (Castells, 1985; Benjamin & Dahms, 2004; Gerster & Zimmerman, 2003; Heeks, 2004; ITU, 2004) and at the same time, it can complicate progressive development agendas, obscure the role of the technology in the endeavour, or even exaggerate the contribution of information and communication technologies for development (Heeks, 1995; Kivikuru, 1996; Rubinoff, 2005; Nwodu, 2007; Rao, 2009). This is consistent with Obijiofor (2009) who is of the opinion that there are in Africa as in other parts of the developing world, two basic considerations regarding the impact of new technologies on socio-economic growth. On the one hand, optimists believe the new technologies would assist Africa to overcome economic problems and on the other hand, pessimists are not quite so sure - they argue that the "harmful effects of the technologies far outweigh any benefits to be derived from the technologies" (Obijiofor, 2009:42). The major fears are based on the assumptions that new technologies would widen the information gap between the haves and the have-nots. Ekeanyanwu (2010) confirms this negative view on the information and communication technologies and postulates that the information and communication technologies have no inherent powers to cause a major and dramatic influence on society or on indigenous culture of local people. This means that in developing countries it is not only the hardware that plays an important role, but people are also needed to operate the information and communication technologies.

The theories of more optimistic theorists regarding the application of information and communication technologies for bridging the digital divide (Harris, 2003:118; Rogers &

Shukla, 2008; James, 2010) are important as they regard information and communication technologies as *bona fide* catalysts to link the developing countries to the information super-highway. Other optimists such as, *inter alia,* Cecchini and Scott (2004:2) articulate that the current experiences in rural India and elsewhere in the developing world, show that "it is apparent that ICT … can be utilized to support poverty reduction strategies and that the use of ICT applications can enhance poor people's opportunities by improving their access to markets, health and education." On this positive view regarding the information and communication technologies, Alozie *et al.* (2011:752) agree with Cecchini and Scott (2004:2) and point out that although information and communication technologies are not a magic formula that would solve all the problems, it is a "powerful tool for economic growth and poverty eradication" which can facilitate the integration of developing countries into the global context. This means that the information and communication technologies revolution could radically alter access to information and increase the growth and expansion of developing countries.

An example of the information and communication technologies changing access to information, is the Youth E-Cooperative Programme, aimed at forging ahead information and communication technologies in South Africa's remote areas, and driven by the Presidential National Commission on Information Society and Development (PNC and ISAD), which entails that 40 youths have been mobilised to assist municipalities in web development (South Africa, 2009). Obijiofor (2010) supports this view (South Africa, 2009) on making information and communication technologies available in South Africa's remote areas and notes that apart from providing connectivity, fibre optic cables will enable developing countries to have a clear distinction in providing quality services through multiple and high-quality direct links to various countries across the globe and to interconnect with several international and local networks. Not only could this application of information and communication technologies reduce poverty (Harris, 2003; James, 2010), but it is also seen as instruments of information and development for small-scale farmers at irrigation schemes (Alibaygi *et al.,* 2011).

Heeks (2004) adopts and promotes a balanced view on information and communication technology, taking into account the positive as well as the negative influences of information and communication technology. Heeks (2004) bases his more balanced view on two aspects that have been downplayed:

- Firstly, failure has been downplayed. Estimates suggest that the majority of information and communication technology-based initiatives end in:
    - "Total failure: A system that never works;
    - "Partial failure: Major goals are unattained;

- "Sustainability failure: The project initially succeeds, but then fails after a year or so; and
- "Replication failure: A successful pilot project that cannot be reproduced" (Heeks, 2004:226).

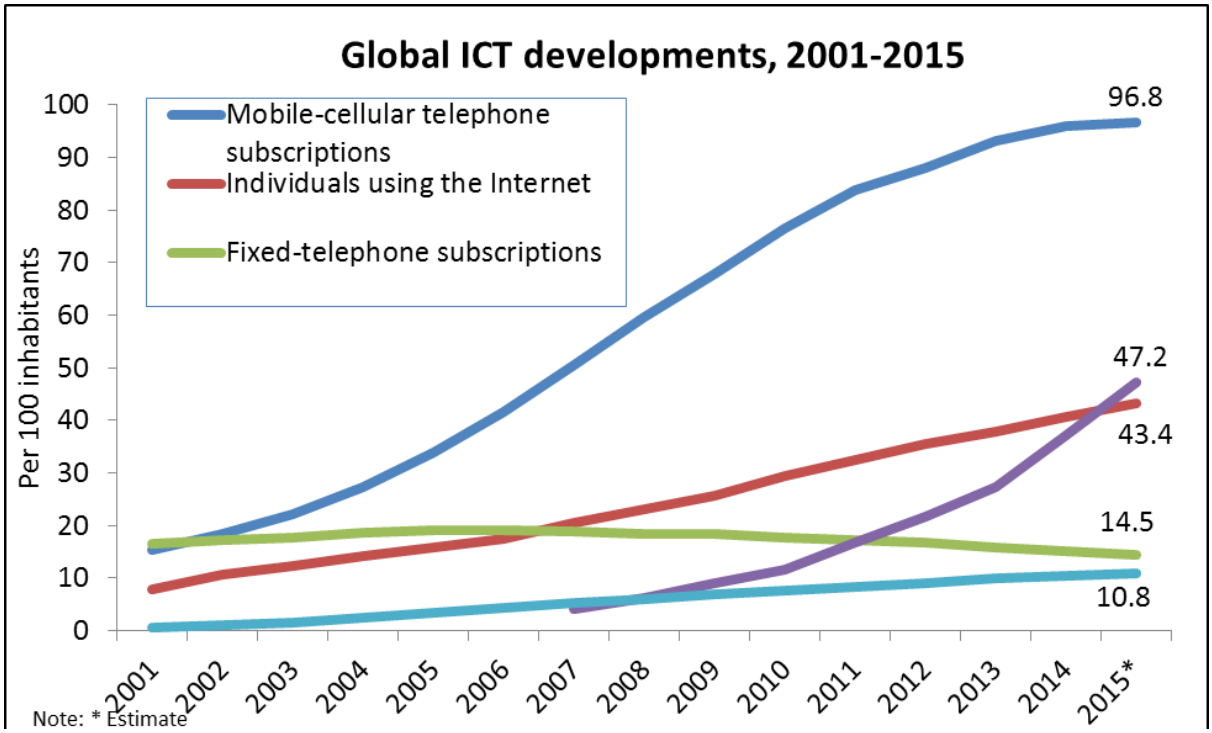
- Secondly, negative impacts have been downplayed. As well as cost reductions, process improvement and communication of information technology, in some cases, has also been associated with negative impacts. These have included job losses, increased stress and impoverished communications (Heeks, 2004; IDRC, 2006c; Ongkili, 2006).

It could be concluded then that an intervention such as the application of information and communication technology – albeit if implemented by means of a telecentre, based on these information and communication technologies – would change the landscape in developing areas by providing developing communities with access to information and communication technologies which would provide these communities with applicable and useful information by means of communication (Feuerstein, 1986; Conradie, 1998; Development Gateway, 2006a; McCarthy, 2006; Saraei & Amini, 2012) that should lead to the development (Harris, 2003:118; Rogers & Shukla, 2008; James, 2010) of these developing communities. Having disclosed this important view supported by these various theorists, it now relevant to take a closer look at the type of information and communication that could link the developing areas to the information super-highway.

2.3.4.3 Information and communication technologies to bridge the digital divide

In 2014 the Yearbook of South Africa (South Africa, 2014) disclosed that although 50 million of South Africa's population lives in poverty, 75% of the low-income groups, older than 15 years of age, own a mobile phone. As 2015 is the deadline for achievements, of the UN Millennium Development Goals (MDGs), Brahima Sanou, Director of the ITU Telecommunication Development Bureau, concludes the following (ITU, 2015): "In 2015 there are more than 7 billion mobile cellular subscriptions worldwide, up from less than 1 billion in 2000. Globally 3.2 billion people are using the Internet of which 2 billion are from developing countries. ICTs will play an even more significant role in the post 2015 development agenda and in achieving future sustainable development goals as the world moves faster and faster towards a digital society".

Table 2.2: Global ICT developments, 2001 - 2015



Source: ITU World Telecommunication/ICT Indicators database

From the above Table 2.2, the following is evident:

- Globally 3.2 billion people are using the Internet by end 2015, of which 2 billion are from developing countries;
- For every Internet user in the developed world there are Internet two users in the developing world;
- 4 billion people from developing countries remain offline, representing 2/3 of the population of developing countries;
- Of the 940 million people living in the least developed countries (LDCs), only 89 million use the Internet, corresponding to a 9.5% penetration rate.

In 2009 the World Bank (2009) explains that there are two main reasons why the application of the mobile telephony in developing countries has overtaken the fixed-line service. First, wireless information and communication technologies can be adopted more quickly because it requires less initial investment in infrastructure than do fixed telephones, which leads to lower prices and higher customer demand. Secondly, while fixed-line markets, which are often dominated by state-owned monopolies, started later, mobile phone markets were generally opened to one or more new entrants from the start (World Bank, 2009). But the ITU (2012) remarks that Africa is fast catching up with the rest of the globe, regarding the availability and use of mobile-cellular phones. This shows that regarding the mobile-cellular

phone, the digital divide has been narrowed to a huge extent. A vast difference in the usage of fixed telephones between Africa and the developed world is also clear (ITU, 2012).

With such a vast growing utilisation and application of the above information and communication technologies, the influence of these information and communication technologies on the cultures of developing peoples should be explored.

2.3.4.4. Retaining culture in bridging the digital divide

The conflicting evidence in the literature poses the question whether information and communication technologies allow remote, indigenous peoples to empower themselves (Attwood *et al.,* 2013) without having to lose their unique cultures. But the positive arguments regarding the introduction of information and communication technologies to developing countries are important, as it entails that these countries now have the opportunity to leapfrog the industrial countries by going straight from undeveloped networks to fully digital networks, bypassing the traditional indigenous communication systems (Van Audenhove, 2001). Australian Aboriginal leader Obijiofor (2009) agrees and proclaims that the Internet does not pose any threat to Aboriginal traditional practices and argues that the Internet will enable indigenous peoples to achieve complete control over representations of themselves, as well as what they choose to release into the public domain. Obijiofor (2009) also remarks that there are examples of communities where new technologies are making a difference in the lives of people, such as in the Aboriginal community in Ontario, Canada, the information and communication technology demonstration project has been substantially successful in mostly reducing geographic and psychological isolation and rural limitations. On this difference made by these information and communication technologies, Obijiofor *et al.* (2009), supports Alexander (2001) who suggests that the Internet is a site where significant and meaningful cross-cultural communication could take place – a place for dissemination of information, controlled by indigenous peoples to the wider public. ITU (2004) and other theorists (Kiplang'at, 2004; Hwang, 2011) confirm by urging that "digitization technologies serve to preserve images and also make them more widely available" – but similarly warn that technologies could also serve an intrusive presence in tribal communities. It could be derived then that, especially concerning the developing, indigenous communities, Kiplang'at (2004) is accurate to remind that findings from studies analysed, indicate that some information and communication technology initiatives showed a substantial impact. Hwang (2011) agrees with the impact of information and communication technologies on a developing country by proposing that newly introduced interpersonal media, based on updated communication mechanisms, produce specific interactive styles that are different from earlier patterns of social behaviour, because social interactions are

likely to be affected by communication tools (Myers, 2008; Obijiofor, 2009; Hwang, 2011; World Bank, 2012). Hwang (2011) suggests that mediated communication by means of new technologies not only provides people with convenient communication channels or modes, but also influences non-mediated interactions. Ogan (2007) articulates that interpersonal media is now considered an essential part of our social system. Hwang (2011:930) is then in line with Ogan (2007) by noting that people can maintain social interactions and form interpersonal relationships by conversing with others freely in either face-to-face (FtF) settings or through various media.

There are thus initiatives that experienced barriers to sustainability. Lessons learnt from these initiatives could be summarised as follows (Van Audenhove, 2001; World Bank, 2009):

- Information and communication technology initiatives should be clear about their development goals and their impact on the community;
- Information and communication technology ventures should be sensitive to local conditions and limitations and information and communication technology employed should be affordable and accessible, easy to use and maintain; and
- Interests and goals of the stakeholders should be aligned with the goals of the intervention.

There are those, though, who argue that there is also a negative side regarding the distribution of the information and communication technologies that leads to the widening of the digital divide: Castells (1998:354) argues that the uneven distribution of information and communication technology, which leads to uneven development, could "no longer be understood in terms of the developing countries and developed countries' duality". There are also the pessimists such as Obijiofor (2009) that suggest, for example, that African governments should ignore the new technologies and concentrate on providing the basic needs of their people in order to reduce poverty such as roads and water. Obijiofor (2009) also outlines that the reason regarding the inequality to access to computers proves to be two-fold: Firstly, there are the workers with higher levels of education which are best able to operate and manage the information technology. Therefore the introduction of information and communication technology widens the gap in opportunities: It allows college graduates to earn higher wages. On the other hand, it reduces demand for – and the wages of – unskilled workers with a high school diploma or less. Secondly, the introduction of a new technology (Obijiofor, 2009; Seo *et al.*, 2009) allows firms to substitute machines for people. The people who are displaced by these information and communication technologies, create a new mass of unemployed that reduces and lowers existing wages.

Perelman (1998) points out in his provocative book *Class warfare in the Information Age*, that the new information and communication technologies are being used to reinforce capitalist power relations. Schech (2002:21) concurs and points out that "a pessimistic stance on information and communication technologies is based on a dependency theory argument". James (2010:375-377), on this negative stance (Perelman, 1998; Schech, 2002) about the information and communication technologies, cautions that globalisation and information and communication technologies cannot cause societal changes on their own – especially in the area of culture, without the aid of the intervening variables such as the sponsors or the initiators of the implementation of the information and communication technologies as such. This means that even in the poorest countries where the majority of peoples do not have access to information and communication technologies, there is a powerful minority that do have access to information and communication technologies and which could contribute to the development of the poor communities by sponsoring the implementation of information and communication technologies (Naik, 2011). But these privileged, however, that have access to information and communication technologies, usually have more interests in common with the upper echelons of other countries than with the rest, or the poorer, population of their own country. Okorie (2010) supports these negative viewpoints and remarks that globalisation and information and communication technologies cannot influence developing cultures positively or negatively without the support of the privileged – those people who are exposed to these information and communication technologies. Schech (2002:18) agrees with Okorie (2010) that cultures cannot be influenced without the support of the advantaged and proposes that "it is the exclusion of peoples and territories from the informational mode of development, rather than their dependent integration, which constitutes the problem". Friedman (1994) argues that cultural diversity must be seen in a global context and explains that the ultimate question is about the global language – the 'English-as-global-language' argument seems equally far-fetched and indefensible and that the use of English as the daily language of a global culture has serious limitations. Another sound argument against English as the global language comes from Obijiofor (2010:101-102) who adds that rather than the emergence of a "global culture", what we are witnessing is the emergence of "culture areas" – not necessarily at odds or in conflict with each other. This means that Spanish, Russian, Arabic, French, Kiswahili and Chinese have become the shared languages of certain groups, communities or population strata across countries located in specific regions of the world – inevitably, globalisation can lead to the development of indigenous languages, which is a major component of culture of any people.

Concluding from the above arguments, it is important to note that there are authors who express their concern that the implementation of information and communication technologies could lead to widening of the digital divide (Castells, 1998; Emberg, 2001; Schech, 2002). They argue that the digital divide will not only widen between the developing (information poor) countries and the developed (information rich) countries, but also between the information rich and the information poor in the same country. Regarding these negative opinions of the information and communication technologies, Ekeanyanwu and Okeke (2010) find the probability of their cultures and traditional industries being swamped by American culture and the English language as unfounded, debatable and questionable, as a result of globalisation and information and communication technologies. On the other hand, there are various theorists and researchers (Heeks, 1995; Castells, 1998; Van Audenhove, 2001:23; Gomez & Ospina, 2002; Schech, 2002; IDRC, 2007c; BizCommunity, 2007; Marshall *et al.*, 2003; Tarjanne, 2003; Okorie, 2010:136-137; ITU, 2012) who believe that the application of information and communication technologies could bridge the digital divide. Their views could be summarised by the opinion of opinion by Marshall *et al.* (2003:iix) who explain that an information and communication "technology revolution is transforming society in a profound way. If harnassed and directed properly, these information and communication technologies have the potential to improve all aspects of our social, economic and cultural life. Information and communication technologies could serve as an engine for development in the 21st century, yet the majority of the world's population has yet to benefit" (Marshall *et al.*, 2003:ix). One way is to attempt, endeavour and initiate the establishment of telecentres, based on information and communication technologies (Everett & Shukla, 2001), in the rural, developing communities, as well as developing countries, for that matter. These initiatives could support these developing communities by providing them with applicable information (Conradie, 1998; Development Gateway, 2006b; Saraei & Amini, 2012) through communication by means of the information and communication technologies, assisting them in their developing processes. The telecentre an initiative, or piece-meal intervention, as called by Crosby *et al.* (2000), is to be discussed in Chapter 3. Following is a brief look at ventures regarding the implementation of information and communication technologies to rural peoples in order to support and enhance their development.

2.3.4.5 Initiatives supporting information and communication technologies in bridging the digital divide

The emergence of information and communication technologies is both a challenge and an opportunity, especially in developmental projects in developing and developed countries. It is a challenge because large amounts of information pass through the Internet, but the penetration is still far away from the vast majority of the people living in the developing world

or in low socio-economic areas of developed countries. The following initiatives, to name but a few, as described by several authors, (Xia, 2010; Alibaygi *et al.,* 2011; Hashim *et al.,* 2011; Tengtrakul & Peha, 2011) have acknowledged the value, importance and consequences of the implementation of information and communication technologies for the development of developing people and are briefly discussed below:

- **Xia** (2010): "The deployment of information and communication technologies in rural areas has long been regarded as a catalyst for rural development", cites Xia in 2010 (Xia, 2010:189) regarding development initiatives in China, with the example that one shared characteristic of the telephone and television 'village access projects' (VAPs) has been the execution of policies through conventional departments. Despite difficulties in the absence of an effective governance procedure, the objectives of the VAPs such as access to villages and industry departments have been successfully accomplished.

- **Alibaygi** *et al.* (2011:1189-1190) explain that the main purpose of a survey research was to investigate the effectiveness of "rural information and communication technology centers for developing e-governance" (Alibaygi, 2011:1189) in the rural communities of the Kermanshah Township, located in the west of Iran. Most of the participants of the study shared the belief that "people can improve their life through information and communication technology planning". The results of the study showed that one of the participants, for example, stated that he sometimes needs to obtain some information on operating the new technologies such as the "Internet, e-mail, digital telecommunications and high-speed broadband" in order to access agriculture-related information and if he had access to the Internet he could browse the websites and find the needed information. Regarding the importance of people's cooperation in the project, one of the participants of the study, for example, stated: "We are even ready to buy some land for information and communication technology offices and supply it with the needed apparatus" (Alibaygi *et al.*, 2011). Overall, the "rural communities and households have assessed ICT centres" (or telecentres as called in the following Chapter, Chapter 3, Section 3.3 by several theorists and researchers (Conradie, 1998; Perret *et al.*, 2003; Aditya, 2006; Anderson *et al.*, 2006; The United Nations Educational, Scientific and Cultural Organization (UNESCO), 2006; International Development Research Centre (IDRC), 2007b), as effective to services such as telephone and Internet registrations, offered by ICT centres such as telecentres. Alibaygi *et al.* (2011) also point out that these ICT centres can empower communities and farmers by providing information regarding agricultural production and marketing, agricultural subsidies, cooperatives and public credits as well as provide training courses that involve participatory planning and management to the staff of rural ICT centres and rural households.

- **Tengtrakul and Peha** (2011) report on an econometric study of information and communication technology in all 70,000 rural villages in Thailand, where the information and communication technology considered consists of fixed-line telephone service, mobile telephone service, public telephones, computers, and Internet service. The results provided information that helps policymakers decide where to engage funds to promote information and communication technology and to target regions that maximise revenues. No evidence indicates that mobile telephone service is a substitute for fixed-line telephone service. The mobile telephone service is seen as complementary to fixed-line telephone service. The study indicated a significant demand for telephone service in rural Thailand without the infrastructure, and the emphasis regarding the importance in determining penetration of information and communication technologies was prevalent in the agricultural sector. According to Tengtrakul and Peha (2011) the results showed, that although affordability might have been a factor, high development in villages with educated people making good use of the information and communication technologies with Internet facilities (with special reference to agriculture).
- **Hashim** *et al.* (2011) from Malaysia report that the 1Nita Project is a national project that aims to increase the e-participation and training of women, especially in economic activities in Malaysia, regardless of their age, race or financial status. In conclusion, the 1Nita project has successfully positioned confident female entrepreneurs in Malaysia with special reference to the rural areas. In terms of economic impact, about 50% of the participants have expressed increased in sales of 30 - 60%. With their acquired knowledge in the usage of the computer, about 60% of the 1Nita participants from both Melaka and Kuala Lumpur areas are enabled to participate successfully in on-line business after the training.

As seen in the above Section, it is not only hardware (infrastructure) (Parker & Hudson, 1995; Jimba, 2003; Ekeanyanwu & Okeke, 2010; Yanggratoke *et al.,* 2011) that is required to bridge the digital divide, but also an understanding of the content or information (infostructure) (Castells, 1998; Van Audenhove, 2001; Gomez & Ospina, 2002; Gurstein, 2003; Tarjanne 2003; Udoudo, 2010; Colle, 2011c). To conclude, there is a substantial group of researchers and theorists that urge that information and communication technologies have proven to have “very positive repercussions in some instances” (Castells, 1998; Van Audenhove, 2001:23; Gomez & Ospina, 2002; Gurstein, 2003:6-8; Tarjanne 2003; Udoudo, 2010:362-363; Colle, 2011c). In the next Section, the infostructure and the infrastructure needed to successfully utilise information and communication technologies are considered and initiatives are discussed in more detail.

This Section comprised a discussion on the role and tasks of the information and communication technologies in bridging the digital divide with Sub-sections on the conditions

as well as prerequisites and constraints faced by the information and communication technologies in order to be able to bridge the digital divide. In the next Section the aspects necessary to utilise and engage these information and communicate technologies in order to be successfully operated and functioning, will be deliberated.

2.4. WHAT IS NEEDED TO SUCCESSFULLY EMPLOY INFORMATION AND COMMUNICATION TECHNOLOGIES

This Section will explain the role that the characteristics of the information and communication technologies, namely the infrastructure and the infostructure, play in order to utilise and apply the information and communication technologies successfully.

Ekeanyanwu and Okeke (2010) emphasise that telecommunication, information services and information and communication sectors are global mechanisms for development. Institutions such as the WSIS are paving the way for information and communication technologies by assigning the ITU with responsibilities regarding assistance in bridging the digital divide, hereby identifying the ITU as the facilitator (Naik, 2011) for Action Lines regarding information and communication infrastructure as well as infostructure.

In the next Sub-sections the concepts of infrastructure and infostructure will be explained. These concepts will then be discussed below, according to theories regarding the global, the African and the South African viewpoints.

2.4.1 Infrastructure

Online communications infrastructures, according to Warschuer (2001), dates back to the 1960's, when researchers in the United States first identified and developed practices and mechanisms for transmitting and receiving messages via computer. On this introduction of the information and communication technologies (Warschauer, 2001), Held *et al.* (1999) note that as digital communication has emerged, a global network that retrieves and sends a combination of pictures, sound and text has been established. Homes and offices now have multiple links to the external environment which includes telephones, fax machines, digital and cable television, electronic mail and the Internet (Giddens, 2001). The opinion of Fortuna and Mohorcic (2009:1366) is important, since they caution that the development of "reliable and robust yet flexible" communication infrastructure enables real-time, secure and cost-effective delivery of data which provides services such as e-health, e-learning and e-payments. Global communications infrastucture (Ekeanyanwu & Okeke, 2010) such as cable technology has become more efficient and less expensive due to the development of fibre-optic cables which has dramatically expanded the number of channels that could be carried. But on the distribution of these 'global communications' by Ekeanyanwu & Okeke (2010), Yanggratoke *et al.* (2011) caution that communication infrastructure is still absent in

many regions of the world, preventing peoples from the accessibility of the Internet as infrastructure as well as infostructure.

Since 1996, “fiber optic communication became a part of public life” (Liu & Rosseau, 2012:9). Regarding the expansion in the use of computers, the optic fibres play a supporting role in the availability and use of the Internet. More and more people are involved in this new form of communication and the speed of communication becomes increasingly faster, while the extent to which communication influences society increases in all senses of the word. On this subject of fibre optic communication, (Liu & Rosseau, 2012:9), Dhliwayo (2012), the Steering Committee Chairman of the NEPAD Council, explains that fibre-optic cable is designed to carry light signals and is made of glass and plastic. The initiative of the submarine fibre-optic network system was launched on 23 July 2009. The cable network serves to directly connect South Africa and Eastern Africa with Europe and Southern Asia, covering a distance of over 17 000 km worth of fibre optic technology. Dhliwayo (2012:32) continues that full bandwidth solutions can now be offered because of the network's capabilities, capacity and extensive coverage – “perhaps the most successful attempt at an African fibre network thus far is the two segment submarine cable system; SAFE (South Africa - Far East) which links Malaysia and India in the east to South Africa via Mauritius and Reunion and SAT-3/WASC (South Africa Trans-Atlantic - West Africa Submarine Cable) which continues from South Africa to Portugal and Spain in Europe with landings at a number of west and southern African countries”. Regarding fibre optics, Beaufils (2000) is of the opinion that one of the most likely reactions one gets when discussing fibre-optic networks in Africa is, “why not satellite technology?” Beaufils (2000) then explains that satelite communications has been around for a while and has provided telecommunications links between Africa and the rest of the world. However, replies the ITU (2012), a comparison between fibre optic and satellite technologies reveals that although satellite systems are the most effective answers and resolutions for television broadcast, for access to remote locations and the network backbone, fibre optic networks on the other hand are more suited for high bandwidth transmission between countries and continents through core networks (or backbones) and submarine links respectively.

There are then also world-renowned institutions which are involved to bring about global infrastucture. While these initiatives are discussed in more detail in the next Section, the ‘Global Information Infrastructure’, (GII) will be discussed briefly as it is one of the leading initiatives in the formation of a global information and communication technology infrastructure.

2.4.1.1 Role of the National Information Infrastructure in global infrastructure

Regarding the founding of the National Information Infrastructure, Griffith and Smith (2000) remark that as far back as in March 1994, during an international forum, the GII was founded and it was decided that this GII should be supported by the "National Information Infrastructure" (NII) (Van Audenhove, 2001:118; Rogers, 2006). During talks and deliberations by the West regarding the GII, the discussions also included interactive, high-speed and high-capacity telecommunication networks. Championed by the then Vice President Gore (Griffith & Smith, 2000), development of the information super-highway and the associated National Information Infrastructure (NII) is considered by many (Griffith & Smith, 2000; Van Audenhove, 2001; Marshall *et al.,* 2003; Rogers, 2006; ITU, 2012) as critical for enhancing American leadership in the information age. The White House defines the NII as "a seamless web of communications networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips" remark Griffith and Smith (2000:139).

It is, however, not only institutions which are involved in building the information and communication infrastructure, since a highly qualified group of researchers (Flickenger *et al.,* 2007) have written a book entitled "*Wireless networking in the developing world: A practical guide to planning and building low-cost telecommunications infrastructure*". The authors are actively participating in the ever-expanding Internet by pushing its reach farther than ever before and have produced this book that documents their efforts to build wireless networks in the developing world.

2.4.1.2 Role of the Internet of Things in infrastructure

Regarding a different kind of infrastucture, namely the Internet of Things (IoT), Zeng *et al.* (2011) explain that the IoT aims at an increasing number of fixed mechanisms (e.g. sensors, mobile phones, cameras, smart meters, smart cars, traffic lights, smart home appliances, etc.) which are capable of communicating and sharing data over the Internet (Atzori *et al*., 2010). Unquestionably, it could be concluded then that the main strength of the IoT is the high impact it will have on several aspects of everyday-life and behaviour of potential users of these mechanisms (Zeng *et al.,* 2011) in order to reach common goals. From the point of view of a private user, the most obvious effects of introducing the IoT will be visible in both working and domestic fields.

The infrastructure, as presented and offered by the information and communication technologies, as seen by various theorists, was discussed in this Section. But it is important to discuss the other feature of the information and communication technologies – the infostructure. In the next Section the infostructure regarding information and communication technologies will be debated.

2.4.2 Infostructure

Vriens (2004) articulates that information disseminated by the basic telephone, whether fixed or mobile, has less limitations regarding the understanding and interpretation process than the newer technologies. Supporting this view of Vriens (2004), are Colle and Roman (2010) pointing out that the telephone is a good place to start a review of the background of information and communication technologies, because physical telephone lines were initially the principal local medium for connecting computers to the worldwide Internet system. Communication by telephone implies that the communicator as well as the receiver of the message should understand each other without difficulty – although depending on how clear the line or reception is, and also whether they could understand each other's language (World Bank, 2009). Vriens (2004) cautions that some language barriers may occur where the communicator and the receiver are not of the same culture, and one or both of them, would have to communicate in his/her second language. This could make the encoding as well as the decoding of the message difficult to a certain extent. On this issue of access, Colle and Roman (2010) also propose that the more viable strategy for developing countries is universal access – an approach that says that a telephone should be within a reasonable distance from everyone and could vary according to factors such as available transportation, road systems, and geography.

2.4.2.1 Infostructure and a knowledge economy

Vriens (2004) also warns that information and communication strategies at both national and local levels often seem to be heavily concentrated on the provision of access to mechanisms and resources and this can lead to information literacy skills being overlooked. A knowledge economy involves the development, storage, interpretation and application of knowledge obtained from the information and communication technologies, as well as its application to more traditional sectors of the economy such as agriculture (Raslan, 2006; Tengtrakul & Peha, 2011). Raslan (2006) sees community inclusion, community building and local content creation as most important aspects to be included for a knowledge economy. Wertlen (2007) agrees on the inclusion of a community (Raslan, 2006) and reminds that each project should involve the community members and contribute towards the process by means of which the community acquires knowledge. Ideally, the community should also create the local content that a community (Raslan, 2006) wants to disseminate via the information and communication technologies. On this language topic, Onuara-Oguno (2010) adds that online discussion refers to the use of all forms of communication that are undertaken through networked technologies. It includes the communication in real time via conversation or discussion software, "with all participants at their computer simultaneously ("synchronised communication") as well as "un-synchronised where the participants are not

at their computers the same time, but where they log onto messages" (Onuara-Oguno, 2010:228-229).

2.4.2.2 Infostructure and Action Lines for the WSIS

Subsequently Van Audenhove (2001) asks the question: "What is the content (infostructure) that we are placing on our monitors or through our infrastructure regarding the Internet?" His reply to his query is that we receive messages dominated by the globally powerful today – messages which are controlled by info-colonialism; basically the destruction of indigenous cultures and languages. But the UNESCO Plan of Action ensures the following (UNESCO, 2009a:21): Cultural and language diversity – also essential for maintaining cultural identity, traditions and religions – is essential for a dialogue among cultures and for global cooperation and sustainable development of an information society. UNESCO (2009b) and other role-players defined four main sub-themes regarding information and communication technologies, thus categorising the Plan of Action's most important issues:

- Heritage and tradition;
- Content from local communities and current cultural communication;
- Linguistic diversity; and
- Present-day research.

In promoting the development of communication networks, UNESCO (2012) emphases the procedures and guidelines to develop the most appropriate methodology in order to address the specific needs of the different communities in order to acquire new knowledge and skills. Working in close collaboration with UNESCO, the following action lines for the WSIS, regarding infostructure, were confirmed at the World Summit on the Information Society of 2011 (WSIS Forum, 2011):

- *"**C1. The role of public governance authorities and all stakeholders in the promotion of ICTs for development*** (Cooperation among stakeholders • Millennium Declaration • Mainstreaming ICTs • Multi Stakeholder Partnership (MSP) • Multi-stakeholder portals for indigenous peoples • National e-strategies • Public/Private Partnerships (PPP);
- "**C4. Capacity building** (• Basic literacy • Distance learning • Education/training • E-literacy • Gender • Combating illiteracy • Life-long learning • Research and development (R&D) • Self-learning • Teacher training • Training ICT professionals • Volunteering • Youth);
- "**C5. Building confidence and security in the use of ICTs** (• Authentication • Building confidence and security • Consumer protection • Countering misuse of ICTs • Countering spam • Cyber-crime, • Cyber-security • Data protection • Information security and

network security • Network integrity • Online transaction security • Privacy • Real-time incident-handling and response • Secure and reliable applications);

- "**C7. ICT Applications** (• Disaster recovery • E-applications • E-agriculture • E-business • E-commerce • E-employment • E-environment • E-government • E-health • E-publishing • E-science • ICT waste disposal • Sustainable production and consumption • Teleworking • Transparency);
- "**C8. Cultural diversity and identity, linguistic diversity and local content** (• Cultural diversity • Cultural exchange and information • Cultural heritage • Cultural industry • Cultural policy • Digital archive • Disadvantaged and vulnerable groups • Indigenous peoples • Internationalized domain names • Language-related ICT tools • Linguistic diversity • Local languages • Traditional knowledge);
- "**C9. Media** (• Combatting illegal and harmful content in the media • Diversity of media ownership • Gender portrayal in the media • Media independence and pluralism • Reducing international imbalances • Role of media in the Information Society • Traditional media • Training of media professionals);
- "**C10. Ethical dimensions of the Information Society** (• Common good • Ethics • Human rights • Preventing abusive uses of ICTs • Values)".

Consequently it could be concluded that this infostructure includes how the information that can be obtained from the information and communication technology is presented including e-education and e-literacy (C4). This includes aspects such as how the information could be obtained from information and communication technologies; whether the information is presented in a country's own indigenous language which points to cultural diversity and identity, linguistic diversity and local content (C8); how the messages are packaged and presented; and whether the information is applicable and appropriate, with specific reference to the Internet. Gurstein (2003) suggests that information and communication technologies support local, developing communities as these communities attempt self-management through combating illiteracy (C4) – by accessing information for development as well as the training and skills (C9) to operate the information and communication technologies. Roman and Colle (2006) agree with Gurstein (2003) on the accessing of information for development, but caution that the Internet may contain questionable content and also that few telecentres undertake research on an indigenous peoples' (C9) information needs. Supporting the telecentre that produces, conveys and provides information, it could be articulated here that the Internet has been accepted as the global disseminator of information that could lead to the development of disadvantaged peoples (C8). UNESCO (2009b) agrees with the Internet being a global disseminator and recognises the Internet as

a global mechanism which reduces international imbalances (C9). In order to ensure its governance to be transparent and democratic, the UN Secretary-General recommended a new forum for multi-stakeholder policy dialogue (C1) on Internet issues, namely the Internet Governance Forum (IGF).

Internet Governance is of key importance for UNESCO, as the Director-General, Mr. Koïchiro Matsuura explained: "Our mandate is to promote the free flow of ideas by word and image and to develop communication between peoples as a means of constructing inclusive, development-oriented knowledge societies based on the principle of freedom of expression, universal access to information, linguistic diversity (C8) and equal access to quality education (C7)", presenting a clear view of the transparency (C7) of the media in the information society (C9) (UNESCO, 2009b).

2.4.2.3 The role of the Internet in the infostructure

In saying that access to information and communication technology is the key to bridging the digital divide, it is assumed that useful and appropriate information, countering the misuse of information and communication technologies (C4), will reach the recipients of information presented by information and communication technologies. Ekeanyanwu (2010) points out that communities now share common values and socio-cultural orientations irrespective of their places of geographical origin, race, language and socio-economic status (C8). A dramatic development in the Internet since WSIS has created user-friendly content (various applications such as e-employment, e-commerce, e-business, e-government, e-publishing (C7) is often called "Web 2.0", says the General Assembly (2012:14).

In spite of the ever-increasing global availability of the Internet infostructure, it is generally felt that there is a dominance of the English language and the content that targets only the needs of English-speaking users (Chisenga, 2003). Because of this dominance of the English language, citizens of a number of governments around the world are requested to produce local content (C8) in their own languages and to publish it on the Internet. This will contribute to the development and conservation of local content in order to protect cultural heritage (C8) on the global information infrastructure. In practice, there is a wealth of English-language content available on the web but specific, localised, and local-language content relevant to USAID's poorer target clients (C8) (USAID, 2004) is lacking. Confirming this view on language (Chisenga, 2003; Tarjanne, 2003), is the General Assembly (2012) explaining that the FAO is seeking financial support for its ongoing work, including in-country interventions and dissemination of content in languages other than English. FAO hopes to establish a permanent secretariat, with the aim of supporting country-level interventions, such as the telecentre, and global knowledge-sharing. The important role that telecentres,

based on information and communication technology, could play in this regard is discussed in Chapter 3.

In this Section a bird's eye view was presented concerning the infrastructure and the infostructure of information and communication technologies. This leads to the concepts of the infrastructure and the infostructure discussed below according to theories regarding the global, the African and the South African viewpoints:

2.5 GLOBAL INFRASTUCTURE AND INFOSTRUCTURE

The discussion on infrastructure and infostructure as debated globally will be addressed in this Section. Firstly, in the next Section, the global infrastructure will be discussed, with Sub-sections regarding the fixed -line as such, initiatives regarding the Action Lines of the WSIS and Initiatives supporting global connectivity.

2.5.1. Infrastructure globally

The following initiatives support the implementation of infrastructure and they discuss infrastructure regarding 'developing countries', such as the G8 and Fuchs (2006); 'to promote information and communication technology' by the CTO (2003), UNESCO (2009a), and DGF (2011) and to 'spread the infrastructure throughout the world' by the GBDe (2006); and UNESCO (2012) as well as the ITU (2015) to 'upgrade infrastructure'.

The view of UNESCO is important, as UNESCO (2012) ensures the development of the most appropriate methodology to meet the specific needs of the different communities by means of the promotion of electronic networks. Working closely with UNESCO, the World Summit on the Information Society (WSIS) is a United Nations Summit on the global benefits and challenges of information and communication technologies. According to the Geneva Declaration of Principles as explained by UNESCO (2009a:12) the aim and objectives of the Summit are to encourage worldwide collaboration and dialogue in order "to build a people-centered, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge." UNESCO´s role in the WSIS is threefold (UNESCO, 2009a:21), namely:

- "An implementer of the Geneva Plan of Action;
- "A facilitator of the implementation of eleven WSIS Action Lines in its area of competence; and
- "A coordinator of WSIS activities together with other United Nations agencies."

In order to execute this role, policy guidelines are necessary and actions to support universal access to information and knowledge should be undertaken, focusing on the following (UNESCO, 2009b):

- information literacy through competence;
- information protection to protect original data; and
- information availability through open and free access.

In collaboration with UNESCO, these actions do have a good grounding in the following Action Lines for the WSIS, regarding infrastructure, confirmed at the World Summit on the Information Society of 2011 (WSIS Forum, 2011:74-83):

- "**C2. Information and communication infrastructure** (• Access • Accessibility • Affordability • Assistive technologies • Broadband network infrastructure • Digital inclusion • Enabling and competitive environment • ICT backbone • ICT connectivity • ICT equipment • ICT services • Infrastructure • Internet exchange points • Investment • Satellite • Traditional media • Remote and marginalized areas • Ubiquitous computing/communications • Universal access/service • Wireless);
- "**C3. Access to information and knowledge** (Access to public official information • Access to scientific knowledge • Digital public libraries and archives • ICTs for all • Multi-purpose community public access points • Open source, proprietary and free software • Public access to information • Public domain information);
- "**C6. Enabling environment** (• Consumer protection • Dispute settlement • Domain name management • E-commerce • E-government strategy • Entrepreneurship • ICT forums • Intellectual property • Internet governance • Legal, regulatory and policy environment • Privacy • Radio frequency spectrum • Regional root servers • Secure storage and archival • Small and medium sized enterprises (SMEs) • Standardization);
- "**C11. International and regional cooperation** (• Financing of ICT networks and services • Infrastructure development projects • International mechanisms • Progress evaluation • Regional action plan • UN global compact)".

The aim of the Summit is to establish a "Connected World by 2015". This could be implemented by means of the following goals to be reached by 2015 (WSIS Forum, 2011):

- **"To develop a common vision and understanding of the information society, drawing up a strategic plan of action for its concerted development"** (WSIS Forum, 2011)**:** Reich's (1991) analysis of the process of globalisation is compatible with that of Giddens (2001) who argues that globalisation (C3, C2, C11) occurs through a process where time and space are made independent of their immediate contexts. This is inline with Reich's (1991) opinion that the global workplace is flexible in both its temporal and spatial contexts to the extent that it can become a basic and vibrant space for communication and innovation among employees. Giddens (2001) adds to this view how this is made possible:

Giddens (2001) argues that communication across distance (C3) depends upon the existence of mechanisms of knowledge that users understand and trust (such as the technical language) as well as mediated communication that can serve as coordinating mechanisms for long-distance communications (C2). The above (systems of knowledge, mediated communication) will utilise broadband network infrastructure as well as ICT mechanisms and services, while foreseeing the protection of intellectual property and to establish a protective regulatory and policy environment (C11).

- **The Summit is also initiated to "define an agenda covering the objectives to be achieved and the resources to be mobilized":** In defining an agenda, the Summit is advised to take into account the needs of the indigenous communities in remote and marginalised areas, such as commonly found in the developing world (C2). Referring to Africa, Raseroka (2008:249-250) points out that indigenous knowledge (IK) is defined as "knowledge that is unique and traditional to a given culture or society and communities, particularly in non-literate societies that, by and large, rely on local technologies for its transmission". Traditional African Information (C2) and IK are recorded through memory and are rooted in folklore and traditional media such as "songs, stories, dances, rituals, local language, myths, beliefs, games, cultural values, agricultural knowledge, knowledge of local flora and fauna and their linkage to medicinal and culinary activities, local history of the earth, stars and water systems, as well as through 'artifacts' such as masks, pottery, carvings" (Raseroka, 2008:249-250) which could just as well form small and medium-sized enterprises (SMEs) (C2). Although 'artefacts' (C2) may be practical and useful aspects of culture, they may also reflect a people's way of life (Seloma, 2007) such as values and experiences, innovations and productivity. On the topic of IK, Raseroka (2008) agrees with Seloma (2007) and notes that IK includes insubstantial cultural tradition embedded in archaeological knowledge (Raseroka, 2008). It is dynamic as it adapts itself to emerging environments such as the establishment of multi-purpose community public access points (C3).
- **"The roles of the various partners (Member States, UN agencies, private sector and civil society) in ensuring a smooth coordination of the practical establishment of the information society around the world" will also be at the heart of the Summit and its preparation:** The effective coordination of the information society (Van Audenhoven, 2001) around the world could be supported and enhanced by means of effective information and communication infrastructure (C2), access to information and knowledge (C3) and an enabling environment (C6). The information and communication infrastructure (Griffith & Smith, 2000; Van Audenhove, 2001; Marshall *et al.,* 2003; Rogers, 2006; ITU, 2012), (C2) which will lead to the ventures regarding scientific knowledge (C3) as well as indigenous

knowledge (C2) is increasingly considered as significant to accelerate socio-economic and ICT development worldwide. Regarding knowledge, Tripatahi (2006) states that many developed countries invest substantially in knowledge and that international financing mechanisms and infrastructure development projects (C11) should be included into the developmental action plans, as outcomes of the Summit.

Apart from these world-renowned organisations of prominence in the information and communication sphere, there are also theorists who caution about the lack of, as well as the accessibility to the information and communication technologies. The feasibility of the following initiatives could be measured according to the implementation of the above Action Lines of the WSIS (WSIS Forum, 2011), pointed out in brackets, such as (C3), (C11), etc.:

2.5.1.1 Initiatives measured according to the implementation of the Action Lines of the WSIS

Rafiq and Ameen (2012), both Professors from **Pakistan**, explain that the electronic access to resources and services is considered important in Pakistan. It could therefore be said that the developing world is experiencing digital transformation in terms of e-initiatives like e-health, e-government, e-democracy and digital libraries. Rafiq and Ameen (2012) propose that the basic reason for this revolution is the development and progress of the information and telecommunication infrastructure (C2). There is an exceptional growth in the use of cellular phones, personal computers, networks, wireless networks and interactive television in Pakistan. Rafiq and Ameen (2012) confirm that Pakistan is witnessing digital transformation by explaining that the country has made a significant development in terms of information society indicators in recent years. Rafiq and Ameen (2012) undertook a study and came to the conclusion that the information society is materialising at a very fast pace in Pakistan. The study revealed that the information society applications such as e-learning, e-political participation, e-government initiatives, e-medicine, information and communication technologies, cellular phones, satellite dishes, the Internet, etc. indicate a noticeable and major growth (C2, C6).

RESULTSLinda (2012) from the **Makerere University** in Kampala, Uganda, undertook a study regarding the impact of integration of information and communication technologies on journalists' work performance (C3). Linda (2012) explains that when measuring and evaluating the impact of integrating information and communication technologies on journalism practice, all the journalists and editors agreed that the application of information and communication technologies has improved their work performance (C6). For instance, research for background information for an article by means of phone calls or to obtain information regarding people from the Internet was quick and immediate. Most journalists

have realised that they are working in a globalised world (C6), where it is not enough to inform their audiences about local events only. Information and communication technologies have made it possible to obtain foreign news easily from global media (C11).

Regarding the developing agriculture, McLaren, *et al.* (2009) from the **International Rice Research Institute** (IRRI) in Metro Manila, Philippines, urge that developments and improvements in information and telecommunications technology, together with associated legal and social developments, are providing an environment for scientists from developed and developing countries to cooperate in order to address real problems of food security and development (C6, C11). McLaren, *et al.* (2009) propose that this enabling technology results in improved connectivity between developed and developing countries and the lowering of the infrastructure barriers to accessing state-of-the-art computer applications (C3). Therefore it could be said that information and communication technology, as the infrastructure, plays a pivotal role in connecting farmers to the information super-highway by disseminating information to farmers.

Obijiofor *et al*. (2001) found in their **Milingimbi** (Australia) pilot study that community elders were eager to learn more about the outside world through the broadcast media and to filter that knowledge to younger people, thereby reinforcing traditional social structures. Knowledge could then be filtered down to younger people by means of multi-purpose community public access points (C2). But Roy and Raitt (2003:412) caution that, although "information and communication technology may provide native peoples with new ammunition to express and extend themselves", there are challenges that confront indigenous people in accessing and using new technologies – in many countries throughout the world, indigenous communities are not always in a position to have access to information and communication technologies and that the problem could be addressed by the establishment of an information and communication technology backbone (C2).

A national information infrastructure initiative (C2) was launched in **India** after the creation of a Ministry of Information Technology in 1999. Interconnected information networks (C3 & C6) link homes, offices, organisations and public institutions. In 2004 the total Internet subscriptions have grown to "over 16.5 million, of which a vast majority was in urban areas" (Rao, 2007:494). Obijiofor (2009) has also found in India that information and communication technology could effectively create and coordinate a bi-directional demand and supply of goods through its information and communication technology infrastructure (C2 & C6).

One area where digital information and communication technology would prove to be of major benefit to indigenous **Canadians** is the preservation of indigenous languages

(Ekeanyanwu & Okeke, 2010:236) such as "Language CD-ROMs, which combine photographs, sounds definitions and phonetic explanations, can contribute to restoring, sustaining and promoting of Aboriginal languages". It could be concluded then that web-sites in mother tongue could also serve to promote language usage, says Alexander (2001) (C6). This could be addressed by making provision for the employing and usage of traditional media (C2) in remote and marginalised areas, where indigenous peoples reside. Provision for the implementation of information and communication technology equipment as well as information and communication technology services (C2) could support the preservation of indigenous languages such as for the Aboriginal, Milingimbi, as well as for indigenous peoples in a global context.

Governance through electronic communication has the effect that peoples could become more devoted and productive citizens of the country, if communication with government could be in their indigenous language. Marshall *et al.* (2003) note that information and communication technologies are emerging as a tool for enabling the development and enhancing of the effectiveness of local leadership. Choi (2009) agrees with Marshall *et al.* (2003) and advocates that research into an e-government strategy; Internet governance; and legal, regulatory and a policy environment (C6) in the indigenous language, could benefit the developing countries as well as developing communities, in governing their own peoples in a manner which is suitable and appropriate to convey public accessible information (C3) to their peoples.

Heeks (2004) notes that after implementing e-government a market-orientated mechanism could be adopted by **government organisations** which support an enabling and competitive environment (C2). Choi (2009:1) is of the opinion that e-governance is therefore "the commitment to utilize appropriate technologies to enhance governmental relationships, both internal and external, in order to advance democratic expression, human dignity and autonomy, support economic development, and encourage the fair and efficient delivery of services." This means that governments should have flexibility, strategy and shorter processing times; and citizens could make contact with and get services from the government through a website where all forms, legislation, and news are available without visiting and waiting in lines at government offices. International and regional cooperation could also be established by means of international mechanism through the financing of information and communication networks and services (C11). It could therefore be said that e-government is not a one-way, but a multiple-way communication process: it includes an entire spectrum of relations in the process of public management of society.

The following Table 2.3 presents the E-Government models for various countries.

Table 2.3: Models for E-Government Institutions in various countries, based on Vriens, 2004

Model	Countries	Benefits	Drawbacks
Policy and investment coordination: Cross-cutting ministry such as finance, treasury, economy, budget or planning	Australia, Brazil, Canada, Chile, China, Finland, France, Ireland, Israel, Japan, Rwanda, Sri-Lanka, United Kingdom, United States	Has direct control over funds required by other ministries to implement e-government. Helps integrate e-government with overall economic management	May lack the focus and technical expertise needed to coordinate e-government and facilitate implementation
Administrative coordination: ministry of public administration, services, affairs, interior, state, or administrative reform.	Bulgaria, Arab Republic of Egypt, Germany, Republic of Korea, Slovenia, South Africa	Facilitates integration of administrative simplification and reforms into e-government	May lack the technical expertise required to coordinate e-government or the financial and economic knowledge to set priorities.
Technical coordination: Ministry of ICT, science and technology, or industry.	Ghana, India, Jordan, Kenya Pakistan, Romania, Singapore, Thailand, Vietnam.	Ensures that technical staff is available, access to non-governmental stakeholders, NGO's and academics	May be too focused on technology and industry and disconnected from administrative reform.
Shared or no coordination	Russian Federation, Tunisia	Least demanding and with least political sensitivity. Does not challenge the existing Institutions and responsibilities of ministries	May lead to rivalries among ministries. No cross-cutting perspective. Fails to exploit services.

Source: Hanna and Qiang, 2009

- **Policy and investment coordination:** "Enabling environment" with consumer protection, e-commerce and a legal, regulatory and policy environment, e-government strategy (C6);
- **Administrative coordination:** "Access to information and knowledge" with access to public official information; access to scientific knowledge; public domain information (C3);
- **Technical coordination:** "International and regional cooperation" with infrastructure development projects, regional action plans as well as C2: regarding information and communication infrastructure with digital inclusion and an enabling and competitive environment (C11);

- **Shared or no coordination**: "Enabling environment" with the implementation of the following aspects such as consumer protection, dispute settlement, e-government strategy and a legal, regulatory and policy environment (C6).

2.5.1.2 The land-line as a global infrastructure

According to Ars Technica (2011) the most basic of information and communication technology, the land-line, or fixed-line phone services, uses a traditional telephone line for communication and Obijiiofor (2009) argues that increased access to telephone lines in underdeveloped areas has led to improved levels in the quality of life of those communities. But regarding telephone lines (Obijiiofor, 2009; Ars Technica, 2011), Rao (2009) cautions that most African countries suffer from a severe undersupply of telephone lines which leads to the fact that in many parts of Africa, Internet access is hampered by absence of telecommunications services. It could be concluded that investment and implementation of universal access have not as yet been sufficiently and adequately accomplished (C2). On the subject of land-line, Ars Technica (2011) points out that getting connected to a land-line service is a very simple process as most residences usually have a landline phone outlet already installed, namely POTS, or Plain Old Telephone Service, delivered over the copper wire public switch to telephone network (PSTN). In developing countries, explains the International Telecommunication Union (ITU, 2012) especially in Africa, where mobile is clearly dominating, fixed telephone lines remain the exception and penetration is at 3 per 100 inhabitants, by far the lowest in the world (ITU, 2012). These developing countries could benefit largely by the implementation of infrastructure development projects and international mechanisms (C11).

Various institutions and organisations are actively involved in the establishment of a global information and communication technology network – all with attractive proposals and intentions, which will be discussed below.

2.5.1.3 Initiatives aiming at global connectivity

In India, the **Geographical-information and communication technology** (Geo-ICT) has demonstrated its effectiveness as a mechanism to gather and disseminate information and knowledge in many decision-making processes (C2, C6) for rural development, almost in a real time (C5) mode (Adinarayana *et al.*, 2008). Adinarayana *et al.* (2008:136) concluded that the Geo-ICT is a valuable tool for effective and good governance at state and private or civil society. Initiatives of the government of India (C3, C6) in this regard the Natural Resources Information System of the Department of Space and the Geographical Information System of the Department of Science and Technology have been established for

the implementing of databases at district level to facilitate the use of Geo-ICT in local level planning and governance (Adinarayana *et al.,* 2008).

The **ITU** (2011) addresses many different aspects of infrastructure development (C2). The theme of the Forum, which was held in Dakar, Senegal, in November 2010, was "Enabling tomorrow's digital world" (General Assembly, 2012:20) with the focus on wireless communications (C2, C3, C6, C11) (General Assembly 2012). The Commonwealth Telecommunications Organisation (CTO) (2003), is an intergovernmental treaty organisation that works as a partnership between governments (C11), the private sector and other bodies to promote information and communication technology in development primarily, but not exclusively, within the Commonwealth of Nations. By integrating the Action Lines of the WSIS with the objectives of the ITU, the G8 and the mission of the CTO, a positive scenario could be forecasted for the global information and communication technology spectrum, by means of the implementation of the following derived guidelines:

- To promote and create the efficient expansion of information and communication technology within Commonwealth and other countries (CTO, 2003), by encouraging participation in global e-commerce networks which is applicable to the WSIS Action Line C6. This is also in line with the ITU (2011) supporting the development, efficient control, management and availability of telecommunications facilities and services – including the development of telecommunications in developing countries. The objective of the ITU (2012) regarding the adoption of a broader approach to telecommunications issues in the global information economy and society, is also applicable here;
- To promote the provision and use of information and communication technology (CTO, 2003) in order to:
    - Meet the needs and aspirations of citizens and consumers (CTO, 2003) by means of building human capacity. The mission of the DGF (2011) (an established non-profit organisation) to promote and encourage the application of information and communication technology in order to reduce poverty as well as sustainable development and assist peoples to overcome the digital divide through practical and dynamic programmes in developing countries is also applicable in this category, together with WSIS Action Lines C2 and C3;
    - To foster policy, regulatory and network readiness (CTO, 2003) in order to support the social and economic development through application of WSIS Action Line C6; and

- To improve connectivity, increase access and to lower of costs in order to enable the successful development of telecommunications and other businesses (CTO, 2003) by means of WSIS Action Lines C2 and C3.

Another initiative aimed at connectivity is **The Global Business Dialogue,** a CEO-led, business initiative, established in January 1999 in Canada (GBDe, 2006). The GBDe's 2005 Work-Plan reflects some of the objectives of UNESCO (2011) regarding infrastructure. This means that forecasts of these two large influential institutions concerned with the extension of the information and communication infrastructure, correspond. The objectives of these two institutions could be integrated as follows:

- Cyber Security is an objective of UNESCO (2011), which also support the_GBDe's (2006) objective to promote a free and better balanced flow of information and freedom of expression;
- The objective of UNESCO (2006) for International Micropayments, authenticates the GBDe's (2006) objective of Securing Electronic Transactions to support the dissemination and exchange of content from developing countries at the national, regional and international levels;
- To contribute to include disadvantaged communities in full participation in the society and to facilitate the merging of the traditional libraries with ICTs in order to accelerate the development of knowledge and to promote access to local content. This is an objective of UNESCO (2001), confirming the objective of the GBDe (2006) of International Assistance to Micropayments; To improve inter-cultural communication and understanding and to create an enabling environment for democratic dialogue through E-Government is an objective of the GBDe (2006) which also upholds the long-term objective of GBDe (2006) relating to Consumer Confidence; and
- To encourage the production of creative, culturally diverse content for radio, television and the Internet in developing countries and to encourage networking of communication and information institutions to widen access to experience and locally produced content for mutual benefit are short-term objectives of the GBDe (2006), encouraging E-government as an objective of GBDe (2006).

In this Section theories regarding infrastructure globally, with discussions on the roles of the WSIS, the backbone structure and the land-line, were discussed in Sub-sections. This bring the other characteristic of the information and communication technologies to the fore, namely the infostructure, which will be discussed in the next Section, with Sub-sections regarding Initiatives supporting global infostructure, theories regarding a global infostructure and intercultural dialogue as well as a global infostructure, with a discussion on cultural

identity. In the next Section with Sub-sections, this infostructure as seen globally by theorists is explained.

2.5.2 Infostructure globally

There are those who say that the infostructure for telecommunications should not only be built, but also expanded, such as UNESCO´s (2012) unique contribution to the World Summit on the Information Society (WSIS) which emphasises the importance of the human dimension of the Information Society beyond connectivity and infrastructures. UNESCO (2012) has been stressing the importance of freedom of expression, education and skills of users, multi-lingualism (C8) and advocating multi-stakeholder approaches (C1) throughout the entire process. Equitable access to information and knowledge is fundamental for building knowledge societies and, therefore, all individuals, organisations and communities should benefit from access to these (C1, C9, C10). The Plan of Action contains 11 Action Lines that translated the general, global, transversal issue into key topics to be addressed in the building of the information society or for many, of knowledge societies. UNESCO is responsible for the following action lines (2012):

- Access to information and knowledge (C9);
- E-science (C7);
- Cultural diversity and identity, linguistic diversity and local content C8);
- Media (C9); and
- Ethical dimensions of the Information Society C10).

2.5.2.1 Initiatives aiming at an accessible global infostructure

The **United Nations Public Administration Network** (UNPAN) (2010) argues that expansion of the infostructure for telecommunications will allow easy access to the Internet, through further availability of the information and communication technology industry and a competitive environment (C1). UNPAN (2010) states that a modern and accessible communication infostructure to nurture the growth of the information and communication technology sector, especially for software services exports and software development, is an important prerequisite of a knowledge-based economy (C8) – a poor infostructure for communications will hamper dissemination through the Internet and discourage the growth of companies that provide software services (C10). When building the infostructure of a country, the local language should be taken into consideration (C8), in order for the users of the information and communication technology to understand the content, or information, obtained by means of the information and communication technologies.

To facilitate multi-lingualism (C8) within the Information Society, **UNESCO** has succeeded to fulfill its role as the United Nations agency responsible for "promoting cultural diversity and identity, linguistic diversity and local content" (General Assembly, 2012:24). Ekanyanwu (2010) also stresses that information and communication technologies could be adapted and applied to suit the cultural needs of developing peoples (C7, C8). UNESCO (2012) agrees with both the General Assembly (2012:24) and Ekanyanwu (2010) and has focused its activities by including the explanation of a document on indicators of linguistic diversity (C8), a report outlining the implementation of the Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace.

One of the most important spheres regarding the content and packaging of information for the peoples, is the governing of the country, explains the **PNC** (2012): E-Government refers to the use by government organisations of information technologies (such as Wide Area Networks and the Internet) that have the ability to build relations with citizens, businesses, and other arms of government (PNC, 2012). The PNC (2012) argues that E-government should place individuals, families and communities at the centre of open networks of knowledge, service, trust and accountability in order to create public value – citizen centred, external focus. The WSIS Plan of Action lays emphasis on the implementation of e-Government by addressing it under C7 as follows (PNC, 2012:67)*:*

- "Implement e-government strategies focusing on innovating and promoting transparency in public administrations and democratic processes, improving efficiency and strengthening relations with citizens;
- "Develop national e-government initiatives and services, at all levels, adapted to the needs of citizens and business;
- "Support international cooperation initiatives in the field of e-government, in order to enhance transparency, accountability and efficiency at all levels of government".

The **Singapore** Government employed a "Five Stage e-Service Content Development Model" in achieving progressive enhancement to the content of the e-services (Chan *et al.,* 2008). In particular, this on-going plan is customer focussed by means of the e-services (Chan *et al.,* 2008:245-247):

- The first and most basic stage is the "publish" stage, where the focus is providing information such as the procedures and guidelines for the various public services offered by government agencies;
- During the "interact" stage, part of the transaction in utilising a public service can be undertaken online;

- With the "transact" stage, the entire e-service can be undertaken online, without requiring a visit to the agency;
- Since 2003, the integration of the services offered progressed to the "Integrate" stage.
- Therefore, in the "integration" stage, related individual services have been integrated in a customer-centered manner;
- Existing literature has mentioned the development of information content up to the "Integrate" stage.

According to Chan *et al.* (2008:246), the Singapore Government has proceeded to a higher level, namely the '3P Integration' level, the "Public, Private and People Sectors Integration" – integration must offer services to the private/people sectors. Thus, e-government infostructure should form a multi-linguistic (C8) platform where all e-services offered by the government can be accessed and understood by all.

Regarding the **academy**, the following theories are considered: Martin and Rader (2003) explain that at York University, the departmental subject-based training is increasing. This view is in line with Kirby (1998) who is of the opinion that the challenge for information academics in educational libraries is to ensure that both students and academic staff can use e-information effectively. Kirby (1998) believes that the growth of e-information has led to changes in education and has created the need for good study skills such as information searching. Martin and Rader (2003) add that the focus should be on the understanding of how information and communication technologies can be used to support staff in their work as well as students in their learning – including the identification of areas where improvements could be made. Action Lines of the WSIS which are supported by the academy are 'Building confidence and security in the use of ICTs' (C5) and 'ICT application' (C7) which could be applied to the academy.

2.5.2.2 Theories regarding a global infostructure and intercultural dialogue

A cultural context, in which global messages could be received, should be established for messages to peoples in various countries (Igben, 2010). UNESCO (2012) the leader of international efforts to preserve tangible and intangible heritage, confirms this view regarding the global transfer of information and promotes cultural diversity by promoting cohesion through the encouragement of intercultural dialogue (C8). This substantiates the view of Alozie (2010) that relocation of cultural inheritance supports the co-existence of major and minor cultures in some communities – which leads to the matter of an accessible electronic medium in which the messages are encoded and decoded.

The question is, though, whether the information presented on a geographic basis, would be organised and presented in the local language of the selected country of the 'Digital Earth', a digital model of the planet created by Borgman (2003). Or will it be in English, the language currently most used by the information and communication technologies and which is not understood by the non-English speaking countries? There are others, though, like Ongkili (2006) who feel that the language of the information and communication technologies, English, should be taught globally so that those in remote areas will also be able to understand the information obtained from the information and communication technology. On this subject of language, Ongkili (2006), in Malaysia, stresses that effective programmes to bridge the digital divide would necessarily include provision of basic information and communication technology infostructure to ensure connectivity and expansion of e-education, including the teaching of English in order for ordinary people to access the information super-highway. The WSIS advocates 'cultural diversity and identity as well as local content' on the Internet; it could be expected from the WSIS to provide guidelines of how this Action Line 8 could be achieved.

Although communication and negotiations among countries is in English (Lai *et al.*, 2010) communication with people using other languages such as Japanese, Chinese or Russian, would need interpreters to translate messages into the local languages. Although relatively new, information and communication technology software to translate documents into a number of languages is available (C8). Similarly, because e-communication is important for e-negotiation, negotiators with higher negotiation self-efficacy are more likely to communicate efficiently and effectively during the online negotiation process. From this view, Lai *et al.* (2010:1015-1016) derive the following:

- "Effect of language self-efficacy on e-negotiation communication efficiency": In an e-negotiation, negotiators with higher language self-efficacy in language diversity (C8) will have higher communication efficiency – everyone must understand what is being said. It is essential to master the language that is being spoken;
- "Effect of negotiation self-efficacy on e-negotiation communication efficiency": In an e-negotiation, negotiators with higher negotiation self-efficacy which could provide online transaction guarantee (C5) will have higher communication efficiency;
- "Effect of language self-efficacy on e-negotiation communication effectiveness": In an e-negotiation, negotiators with higher language self-efficacy in cultural information (C8) will have higher communication effectiveness;
- "Effect of negotiation self-efficacy on e-negotiation communication effectiveness": In an e-negotiation, negotiators with higher negotiation self-efficacy in the ethic dimensions of the Information Society (C10) will have higher communication effectiveness.

The question is, though, how to integrate and assimilate the higher language self-efficacy as explained above, with the local cultural identity of the indigenous communities.

2.5.2.3 Theoretical opinions regarding a global infostructure and cultural identity

James and Ziebell (2003) explain that beyond local information provision, the local cultural identity, of which language is a key factor, could play an important role in reconnecting communities with the latest information and communication technology software which translates messages into the indigenous language of peoples (C8).

In India, using the website of GramyaVikas ('rural development'), users share their views, ideas, plans, issues and topics, methodologies and problems, involving rural development schemes. Without meeting FtF with one another, they are enabled to make decisions mutually (Adinarayana *et al*., 2008). Adinarayana *et al.,* (2008) continue that in India an Information Technology based on a personalised agricultural extension system delivers high-quality personalised farm-specific agro-expert advice in a timely manner to each farmer, at the farmer's doorsteps. India also provides a multi-lingual online question and answer forum, called 'Almost All Questions Answered' which provides online answers to questions asked by farmers and agricultural professionals over the Internet.

In the above Section, a global view was presented regarding the information and communication state of affairs. This steers to the characteristic of infrastructure applied in Africa which will be explained in the next Section, supported by Sub-sections such as theories on the interconnection of Africa and the rest of the world as well as on initiatives on the implementation of infrastructure in Africa, the backbone connecting Africa to the information super-highway.

2.5.3 Infrastructure in Africa

In this Section, attention is paid to globalise the indigenous cultures of Africa through information and communication technologies. This means that the cultures of indigenous peoples could be exposed on a global scale – through the application and usage of the indigenous people's language on the information and communication technologies, the aspects of their cultures such as beliefs, needs, norms, etc. would be heard globally.

2.5.3.1 Theories on the interconnection of Africa and the rest of the world

Expanding access to advanced information and communication technology would be a key factor in sub-saharan Africa's economic and social development (World Bank, 2009). Obijiofor (2009) poses the question whether the new technologies such as the Internet, e-mail and high-speed broadband could assist Africa to kick-start its troubling economy.

Obijiofor's (2009) solution is that, on the basis of research evidence from various developing countries, including African countries, it could be said that there are positive results regarding the implementation of new technologies and the socio-economic growth and development of different countries and local communities – the challenge remains, though, for African governments, private businesses, community groups and individuals to find ways for the continent to access the full benefits of new technology distribution and use. Dhliwayo (2012) from the NEPAD Council, confirms this statement of Obijiofor (2009) and urges that the African telecommunication status – poor infrastructure, high cost of telephone calls to other African countries and low Internet usage – are changed by means of the continental fibre-optic backbone that interconnects Africa and the rest of the world via current and planned undersea fibre-optic cables. UNESCO (2012) has also, working in collaboration with the African Union and its New Partnership for Africa's Development (NEPAD) programme, identified Africa as a global priority and has integrated Africa into all phases of UNESCO's development and implementation programmes**.** Lwoga *et al.* (2010) remark that most farmers in Nigeria, of which the majority are women, uses indigenous knowledge to ensure food security and to improve their farming activities. Although the farmers rely more on person-to-person communication – "FtF", as called by Hwang (2011:930) – than information and communication technologies for obtaining indigenous knowledge, Lwoga *et al.,* (2010) confirm that the information and communication technologies have promoted and encouraged the dissemination of indigenous knowledge, especially the radio which is the predominant tool used by farmers to acquire indigenous knowledge. Akullo *et al.* (2007) also point out that the radio programmes are the major information and communication technology channel used by farmers to obtain indigenous agricultural knowledge in Uganda and that most farmers in Tanzania use national radio (Tanzania Broadcasting Corporation) to access indigenous knowledge on farming practices.

The issue regarding infrastructure has been researched by and commented on by several theorists:

2.5.3.2 Theories and initiatives on the implementation of infrastructure in Africa

The following information regarding fibre-optic cables in Malawi through **ESCOM**, were presented by Malakata in 2008 (2008) in the *Sandton Central AGM Report 2010 – 2011* with the title 'ESCOM begins laying fibre-optic cables'. It reads that the Electricity Supply Corporation of Malawi (ESCOM) has started laying fibre-optic cables that will connect Mozambique with the Zambian border town of Mchinji to enable e-communication (Malakata, 2008). "The cable networks will connect Tete in Mozambique and Mchinji and will provide services ranging from voice, data, fax and radio communication system," announced Harris Chinguwo, ESCOM chief engineer for fibre communication, at the 6th International

Conference on Open Access in Malawi (Malakata, 2008:32). The company is laying the cable by power lines throughout Malawi in order to build the networks that will later create the country's national fibre-optic backbone.

Lwoga *et al.* (2010) referring to the high ownership of the mobile phone in Nigeria, sees the mobile phone as an important communication medium for accessing indigenous agricultural knowledge. Cell phones are used by farmers to communicate their indigenous practices as well as by extension officers in Kilosa to communicate and advise with livestock herders regarding the conditions of their animals in the grazing field including any disease outbreak. Farmers in the Moshi Rural also use cell phones to communicate with Floresta NGO to access indigenous knowledge on new varieties and techniques such as local herbs for treating animal and plant diseases. This means that, conclude Lwoga *et al.* (2010) it should be made possible for small-scale farmers to document and share their knowledge if they are guided and empowered by means of the Action Lines C2 and C6 of the WSIS. This could lead to the documentation of indigenous knowledge by local people and the dissemination thereof through telecentres and online databases.

In **West Africa**, the Volta River Authority which distributes hydroelectric power from the Volta River, has been planning to install fibre cable along its grid. The Volta River Authority has already become a licenced telecom operator in Ghana. A fibre link between Mombassa and Nairobi in Kenya will take advantage of the planned East African Cable Submarine Cable System (EASSY) landing points in Mombassa (Dhliwayo, 2012).

Mayaki (2012) notes that NEPAD has, since its inception in 2001, acted as a regional facilitator in promoting and connecting African countries and institutional agencies for mutual learning related to the continent's development priorities and agenda. To quote the classical African writer, Mbiti (1988:67), one may say that this is an era in which a "new and rapid rhythm is beating from the drums of science and information and communication technology and the man of Africa must 'get up and dance', for better or for worse" – the governments in the workplace as well as the man in the street must learn to use these information and communication technologies, no matter how unfamiliar these technologies may seem and how unaccustomed the peoples are to these technologies.

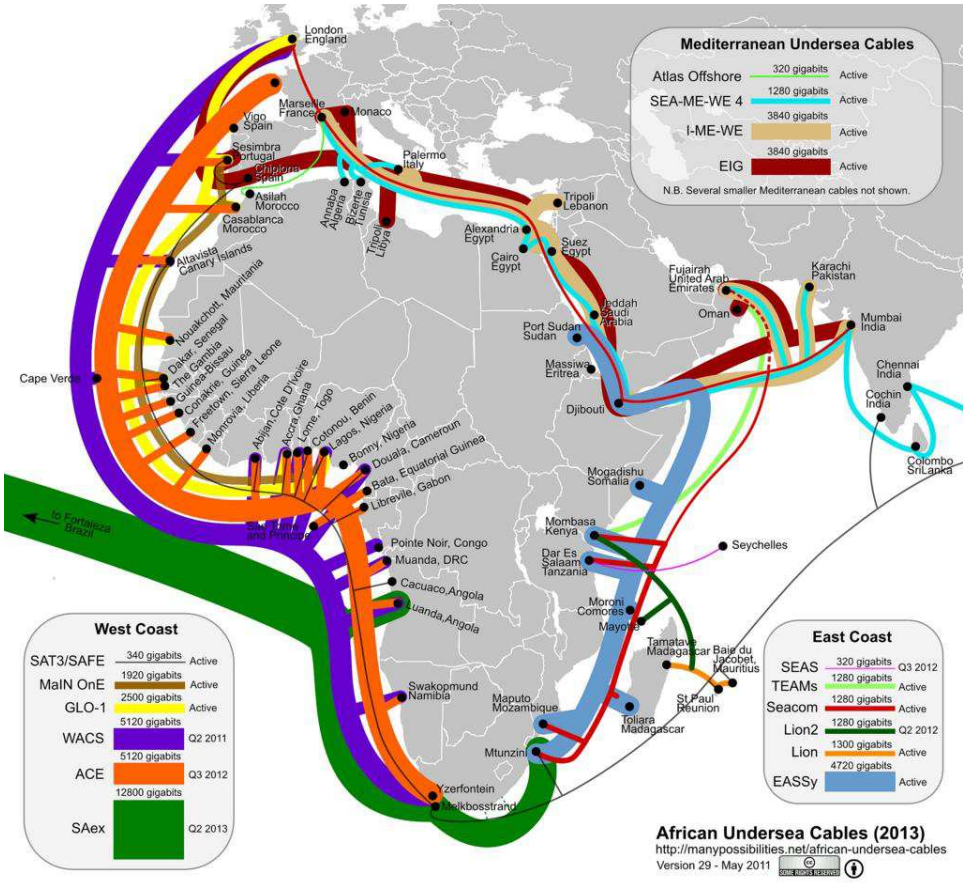
African administrations and other governments in the developing world recognise the role of information and communication technologies in national development (Alozie 2010). At time of independence, African governments recognised, invested and developed their mass media and telecommunications infrastructures as mechanisms to be used for the political, economic, cultural and social mobilisation as well as for the modernisation and development of their countries and of their peoples (Faringer, 1991; Bourgault, 1995). Moemeka (1994)

describes the policy as communication development, which these governments hoped would enable them to implement development communication. It could therefore be concluded that the use of mass communication channels as mechanisms for social mobilisation and transformation is development communication and that the African countries have various initiatives for linking them to the information super-highway.

2.5.3.3 Connecting Africa to the information super-highway by means of backbone infrastructure

There have been continued "positive developments in infrastructure in Africa", articulates the General Assembly (2012:13). The entire coastline is now connected to international submarine fibre-optic cables, and governments and businesses in many countries are upgrading national backbone networks and/or inter-country connectivity. From Figure 2.1 it could be concluded that all undersea cables in the Mediterranean are active (Atlas Offshore, SEA-ME-WE 4, I-ME-WE and EIG). Two cables connect the West coastline and the last cable to be connected is the SAex in Q2 2013 with 12800 gigabits. The East Coast is connected by four active cables and should also have been connected in Q2 2012 by Lion2 and SEAS in Q3 2012. Wholesale tariffs have decreased and promise further benefits in the future. Mobile telephone subscriptions have increased, along with innovations in mobile banking and e-services, connecting Africa to the information super-highway.

Figure 2.1: Sub-Saharan Africa undersea cables projected for 2013



Source: *African Economic Outlook 2012* (2012)

Globalisation and distribution of information have become important Nigerian theoretical frameworks in order to examine as the production, distribution, consumption and impact of information and communication technologies, according to Alozie (2010) and Chattopadhyay (2010) in connecting Africa to the information super-highway.

Luk *et al*. (2009:119) support the importance of information and communication infrastructure but have found that in **Ghana** an uneven availability of broadband Internet infrastructure which is frequently unreliable where available, and which is dependent on budget allocations of institutions. Other options are available throughout the country, such as dial-up, satellite, and mobile data plans, but these are generally expensive, unreliable, and/or slow as well.

Nevertheless, **NEPAD** plays a major role in the establishment of infrastructure in Africa. The NEPAD strategic framework document arises from a mandate given to the five initiating Heads of State (Algeria, Egypt, Nigeria, Senegal and South Africa) by the Organisation of African Unity (OAU) to develop an integrated socio-economic development framework for Africa. The 37th Summit of the OAU in July 2001 formally adopted the strategic framework document (NEPAD, 2006). One of the NEPAD primary objectives is to halt the marginalisation of Africa in the globalisation process and facilitate its full and beneficial

integration into the global economy. In other words, NEPAD is designed to address current development challenges facing the African continent. One of the sectoral priorities is infrastructure (technologies) (NEPAD, 2004).

This Section discussed and explained the infrastructure applied in Africa with theories on the interconnection of Africa and the rest of the world, as well as on initiatives on the implementation of infrastructure in Africa; the backbone connecting Africa to the information super-highway. The equally important aspect regarding the infostructure in Africa, will be explained in the following Section.

2.5.4 Infostructure in Africa

This Section will argue the stance of infostructure in Africa with special reference to the rural, developing communities.

Calls for publishing local content on the Internet are also being heard from the African continent but the degree of comprehensiveness of the local content on the web servers varies greatly (Chisenga, 2003). Web-content should be in the language of the specific country served, with links in languages of countries of the developed world, as well as that of neighbouring countries. Generally, there are very few well-established local content developers on the continent.

Moemeka's (2007) observation is that ideas, theories and values from the Western developed countries, had been dumped on developing countries, with specific relevance to Africa. This observation is the basis of Africa's problems in relation to Western support. Colle (2011b) agrees with Moemeka's (2007) statement and notes, regarding the agricultural sector in Africa, that information management is more serious than before, due to the globalisation of the food system by the increasing demand for food and fibre; the occurrence of new pests and diseases that directly affect agriculture, new marketing systems, and international politics in the developing countries.

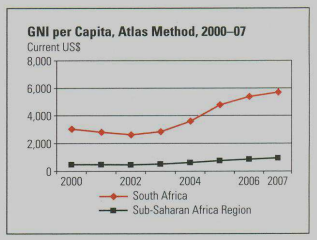
Globalisation, made possible by information and communication technologies, does not give any better recognition to African culture. Lekoko (2010) also points out that the indigenous communities live in rural areas, excluded from participating in the global languages of the information and communication technologies. The global information and communication technologies are rather applied in the way the West wants to rule the world. The information and communication technology helps to work the ambitions of the West faster than spreading and disseminating knowledge for development to the developing countries (Gurstein, 2003).

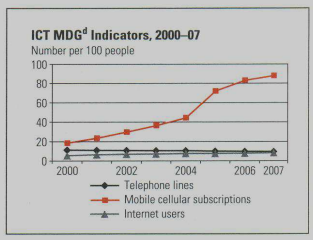
The United Nations' Economic Commission for Africa (UNECA) indicates that surveys have shown that Africa generates only 0,4 percent of global content, and if South Africa's contribution is excluded, the figure is a mere 0,02 percent (Chisenga, 2003). Ndeta (2003) also points out that the Internet business in developing Africa is still very much underutilised as the people are not computer literate. Agreeing with Ndeta (2003), Presly (2010) argues that the reason for this situation is that the African culture is a symbolic system where encoding and meaning is a function of the connection between custom and symbols – a system of shared symbols which is now challenged in the processing of a national development that adopts a "'one-size-fits-all' approach which assumes homogeneity of the indigenous groups" (Lekoko, 2010:53-54). This gloomy situation should be a matter of major concern to the people of Africa, especially information professionals on the continent.

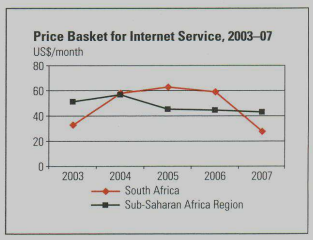
This Section debated the importance of infostructure which was emphasised by the decision that applicable content should be developed and that market surveys be conducted to assess the needs and questions of the communities (Van Audenhove, 2001). The importance of the telecommunications infrastructure and infostructure is also recognised in South Africa. Focusing on South Arica, organisations supporting her infrastructure as well as infostructure, and also initiatives that play a role in this regard, will be discussed in the next Section supported by Sub-sections.

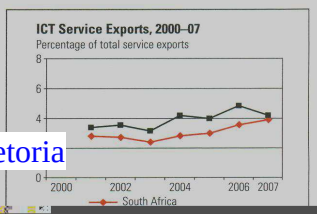
South Africa

	South Africa 2000	South Africa 2007	Upper-middle-income group 2007	Sub-Saharan Africa Region 2007
Economic and social context				
Population (total, million)	44	48	824	800
Urban population (% of total)	57	60	75	36
GNI per capita, World Bank Atlas method (current US$)	3,050	5,720	7,107	951
GDP growth, 1995–2000 and 2000–07 (avg. annual %)	2.5	4.3	4.3	5.1
Adult literacy rate (% of ages 15 and older)	—	88	94	62
Gross primary, secondary, tertiary school enrollment (%)	76	*77*	*82*	*51*
Sector structure				
Separate telecommunications regulator	Yes	*Yes*		
Status of main fixed-line telephone operator	*Mixed*	*Mixed*		
Level of competition[a]				
International long distance service	*M*	*C*		
Mobile telephone service	*C*	*P*		
Internet service	—	*C*		
Sector efficiency and capacity				
Telecommunications revenue (% of GDP)	5.1	*7.5*	3.3	*4.7*
Mobile and fixed-line subscribers per employee	264	*1,145*	*566*	*499*
Telecommunications investment (% of revenue)	25.5	*9.8*	—	—
Sector performance				
Access				
Telephone lines (per 100 people)	11.3	9.7	22.6	1.6
Mobile cellular subscriptions (per 100 people)	19.0	88.4	84.1	23.0
Internet subscribers (per 100 people)	1.6	*9.1*	9.4	*1.2*
Personal computers (per 100 people)	6.6	*8.5*	*12.4*	*1.8*
Households with a television set (%)	55	*59*	*92*	*18*
Usage				
International voice traffic (minutes/person/month)[b]	2.1	—	—	—
Mobile telephone usage (minutes/user/month)	—	106	137	—
Internet users (per 100 people)	5.5	8.3	26.6	4.4
Quality				
Population covered by mobile cellular network (%)	92	100	95	*56*
Fixed broadband subscribers (% of total Internet subscrib.)	*0.3*	*3.9*	47.8	*3.1*
International Internet bandwidth (bits/second/person)	8	71	1,185	36
Affordability				
Price basket for residential fixed line (US$/month)	13.3	20.8	*10.6*	12.6
Price basket for mobile service (US$/month)	—	13.9	*10.9*	11.6
Price basket for Internet service (US$/month)	—	28.2	*16.4*	43.1
Price of call to United States (US$ for 3 minutes)	1.98	*0.79*	*1.55*	*2.43*
Trade				
ICT goods exports (% of total goods exports)	2.0	*1.8*	*13.5*	*1.1*
ICT goods imports (% of total goods imports)	13.6			
ICT service exports (% of total service exports)	*2.9*			
Applications				
ICT expenditure (% of GDP)	—	9.7	5.2	—









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(Source: World Bank, 2009)

Table 2.4 presents the self-explanatory indexes of the access, usage, quality, affordability and applications, as well as an exposé, of the various structures.

2.5.5.1 Initiatives supporting the infrastructure development in South Africa

TENET (2012) explains the Fibre-Optic Backbone of South Africa as follows: The South African authority ICASA has already assigned WiMAX licenses to several providers, and Neotel is implementing WiMAX-based last mile resolutions in Johannesburg, Pretoria, Cape Town and Durban. SEACOM is completely African-owned and its bandwidth has already been sold to several customers, including TENET. EASSy (East African Submarine Cable System), sponsored by the World Bank and the Development Bank of Southern Africa, is a cable system that links Mtunzini (South Africa) and Port Sudan (Sudan), with divisions to various countries on the eastern coast of Africa.

The **South African National Research Network** (SANReN) forms part of a comprehensive South African government approach to cyber-infrastructure to ensure successful participation of South African researchers in the production of global knowledge. SANREN is perhaps the most successful attempt at an African fibre network so far. Together with the

Centre for High Performance Computing (CHPC) and the Very Large Datebases (VLDB) project, SANReN forms a key component of this cyber-infrastructure as a core scientific infrastructure for South Africa.

The following accomplishments of SANReN for 2011 are confirmed in the Executive Summary (TENET, 2012):

- The completion of the Tshwane metro network and the completion of the Ethekwini metro network are major milestones. The Cape Town metro network roll-out (which includes Stellenbosch) is progressing smoothly;
- RFPs for the installation of network links to universities and other locations outside the main cities (remote locations) have been evaluated and contracting will be completed soon;
- Contracts have been signed for new equipment ordered which will ensure that equipment is available to networks extensions as they are handed over to SANReN;
- The installation of a temporary service to the SKA core site has been completed and the installation of the permanent link has commenced.

The electricity parastatal Electricity Supply Commission (ESCOM) has also been installing fibre along its grid in South Africa and in neighbouring countries. South African cellular operator Maritime Telecommunication Network (MTN) has announced plans to build a 5 000 km fibre-optic network covering the country's major centres within the next two years in order to cope with the increasing demand for bandwidth from its customers. "MTN has designed and mapped out its own national backbone network and is in the process of going out to tender to identify relevant suppliers and obtain final castings for the laying of 5 000km of optical fiber cables to build the MTN network," MTN SA managing director Tim Lowry said in a statement (Dhliwaye, 2012:212).

The diverse agricultural communities in South Africa, and even in southern Africa, may also benefit from these initiatives created by GBDe and UNESCO. For example would different small-scale agricultural societies spread throughout South Africa that encounter similar challenges in terms of production factors such as climate, water availability and infrastructure, realise the benefits from forming an inclusive e-based knowledge society?

Such knowledge society may enable effective networking such as the exchange of knowledge and information between them, provide a Cyber Secure platform for trade through e-transactions with the markets and among themselves, enable inter-cultural communication and understanding and would encourage more communication and information aspects.

2.5.5.2 Organisations supporting the infrastructure in South Africa

Agricultural societies in South Africa are diverse in terms of scale, economic level, sophistication, the markets they penetrate and their own developmental needs and these initiatives could form a platform that may address the different challenges of those diverse societies:

- Established in 2002, the **Telkom** foundation provides ICT, education, infrastructure and community projects and renders support in under resourced areas (South Africa, 2009). This means that Telkom could also provide landlines to the rural farmers in isolated areas. With its core market in South Africa, Telkom contributes 98.9% in revenue (South Arica, 2014). The organisational structure comprises three major business divisions: Telkom South Africa, Telkom International and Telkom Data Centre Operations.
- Currently all South Africans benefits by the **South African Post Office** which introduced new and improved products and services. The Thusong Service Centres, at almost 700 small and isolated villages, provides the population access to the Internet through Public Internet Terminals in the local Post Office, besides its original landline services. Access to government websites is free of charge from these terminals (South Africa, 2009) which present information and communications from the fixed land-line to Internet connectivity.
- Serving 55 000 customers daily, **PostNet** is South Africa's largest privately owned counter network in the document and parcel industry, trading across more than 250 owner-managed retail stores with five product types within PostNet, namely courier, copy and print, digital, stationery and mailboxes (South Africa, 2014).
    - The **Department of Communications**, in collaboration with Sapo, is in the process of establishing Public Internet Terminals (PITs) that provide electronic addresses to citizens through Internet kiosks in post offices around the country. During 2004, 600 PITs were installed throughout the country, bringing the total number of PITs rolled out to 700. Most of them are established in settlements without Internet Cafés or other access to the Internet (South Africa, 2009).
- The Department of Communication's **infrastructure provision** for the 2010 Soccer World Cup involved the upgrade of Telkom's primary network to address FIFA's requirements. R300 million was being spent on broadcasting and telecommunications (South Africa, 2009).
- **Online media:** According to the August 2013 Digital Media and Marketing Association (DMMA)/Effective Measure, websites statistics revealed that South Africa, in order to register 633 589 222 page viewers, has created 23 183 796 unique browsers. Unique

browsers from mobile devices visited 11 559 199 sites registering 250 566 538 page viewers (South Africa, 2014).

- The **Universal Services and Access Agency of South Africa** (Usaasa) has the mandate to promote, support and monitor the achievement of universal service and access in underserviced areas. *Inter alia,* the Usaasa (2009) creates a supporting environment by promoting public awareness of the benefits of ICT services and creating access to these services (South Africa, 2009). The Agency plays a key-role in facilitating the achievement of 100% ICT penetration by 2020 (South Africa, 2014);
- Bill Gates, for instance, the then Chairman of **Microsoft Corporation** opened the first digital village in Soweto, South Africa and mentioned that Soweto was a milestone. Gates said that there are major decisions ahead about whether information and communication technology will leave the developing world behind and, therefore, the Soweto initiative (Africare, 2003). This shows that access to the infrastructure is important and access to information and communication technology in South Africa is seen as a precondition for the development of the economy and for the use of information and services in all sectors.
    - **The Presidential National Commission on Information Society and Development** (PNC and ISAD) was formed in 2001 and aims to employ information and communication technology infrastructures in South Africa's remote areas. This will change the development landscape in remote areas by providing citizens with access to all information and communication facilities (South Africa, 2009).
    - **Telecentres** form part of the infrastructure (Painting, 2004; Development Gateway, 2006b; Rao, 2008). Although telecentres are to be discussed in Chapter 3, it is important to note that no information on the establishment of a telecentre in the developing agricultural sector in South Africa is available in the literature. Such an agricultural telecentre could bring important communication structures to the rural farmers and are not only crucial for information regarding agriculture-related needs, but also to communicate with other agriculture-related organisations such as NGO's, cooperatives and markets as well as Departments such as the DWA and DAFF. Although telecentres described in the literature are established in rural areas, it does not follow that these centres were established in the agricultural sector as such.

This Section deliberated on the infrastructure characteristic of the information and communication technologies as utilised in South Africa, with Sub-sections on various supporting initiatives and organisations in South Africa. This extends to the next Section which discusses the information and communication technologies regarding the infostructure

in South Africa with reference to the various institutions contributing to engage the infostructure in South Africa, including institutions contributing to infostructure in South Africa.

2.5.6 Infostructure in South Africa

The view of Van Audenhove (2001) is important, as Van Audenhove (2001:149) notes that the importance of infostructure in South Africa is also acknowledged and the three aspects that are seen as key to changing South Africa into an information society are "infrastructure, content and application". Naidoo concurs with Van Audenhove's (2001) view regarding infostructure in South Africa and comments that developments in broadcasting, telecommunication and media affect both the infrastructure and the content aspects of the telecommunications sector (Naidoo, 1997). The challenge, though, for South Africa, is to produce content in accordance with indigenous culture, e.g. the languages, traditions, dances, drama and songs and taking into consideration the traditional African communication system which is dominantly by word-of-mouth, according to Zeng *et al.* (2011). In this regard, Alozie (2010) proposes that government initiatives toward e-service delivery are being matched at the local level by the development of increasingly sophisticated community information networks and portals. The following institutions and establishments contribute to the information infostructure in South Africa.

Institutions contributing to an infostructure in South Africa

The following institutions and establishments make contributions to the information infostructure in South Africa:

- An initiative in South Africa, supporting development, is the **Centres of Excellence** (CoEs); a collaborative programme between Telkom, the telecommunications industry and government, to promote postgraduate research in IT and allied social sciences. Launched in 1997, the programme improves local telecommunications and IT skills. More than 1 800 postgraduate degrees had been awarded thus far (South Africa, 2009).
- Another initiative promoting the information and communication technologies is the **Presidential National Commission on Information Society and Development** (PNC on ISAD) which has made important recommendations regarding the need for planning and foresight; coordination and integration; and evaluation and impact assessment in the building of the information society. 40 youths have also been mobilised into 20 e-

cooperatives to assist municipalities in web development to become enterprises in Internet Cafés and other ICT-related activities in their areas (South Africa, 2009).

- Advocating development in South Africa is the **Human Sciences Research Council** (HSRC) which has made a study on information and communication technology development in schools in South Africa (HSRC, 2007) and one of the findings of the study was that there is considerable variation in the presence of emerging pedagogical practices. Strategically important is to increase learner access to information and communication technologies in the curriculum, in order to ensure that school leavers moving into the labour market or into further study – they should have the appropriate background and capacities to succeed. This is important as work and educational environments are becoming increasingly information intensive. It could be assumed that the content offered by the information and communication technologies should be reviewed in order to address the needs of the curriculum of the schools in South Africa. A recommendation of the study was that teachers should have pre-service training in the field of information and communication technology (HSRC, 2007). Conradie and Roodt (2007) also support e-learning in South Africa, and say that TeleTuks is a community-based project that provides free satellite TV-based lessons to Grade 11 and 12 learners in secondary schools throughout South Africa. The broadcasts are meant to supplement local teacher's lessons, and are supported by Internet and telephone feedback links for interactivity with the specialist presenters in Pretoria, South Africa. This means that the content should be suitable to teach and supplement the curriculum of the learners. Conradie and Roodt (2007) also articulate that in order for a country of the developing world to become an information society, skills should be built for producing and using information and communication technologies and information and communication technology services, and an appropriate environment should be developed and implemented. This environment is not only applicable to schools, but to the whole country in order to become a developed economy.
- The **IDRC** (2007a) has also done research regarding the infostructure and one of their focal points was the provision of better information and service delivery, promoting principles of good governance and encouraging public participation. The IDRC (2007b) also has another registered project, namely to develop a information and communication technology policy that will allow governments to make informed decisions on information received from people via their home page by means of the information and communication technologies .

In conclusion it could be said that South Africa is seen as the leader of the African continent in the "production and the export of African content" (Van Audenhove, 2001:144), who feels

the production of content must not only be stimulated at a national level, but also regionally and locally. The importance of the infrastructure as well as the infostructure of information and communication technology with special reference to South Africa was discussed in this Section. Focusing on South Africa, the current situation on how South Africa employs information and communication technology for development, will be discussed below in the following Section.

2.6 ICT FOR DEVELOPMENT IN SOUTH AFRICA

This Section deals with the application of information and communication technologies for development in the rural, agricultural sector in South Africa.

Generally, the literature points to an attitude of looking at the poor as the helpless and hopeless: This gives those in power capacity to determine how the poor should live (Schech, 2002; Nyuykonge, 2003; Lekoko & Morolong, 2007; Quadir, 2010). Where this viewpoint exists, indigenous communities are regarded as objects of development. It is, therefore, important to note that a clear vision of how to build capacity in indigenous people to take care of their development projects should be created. There is evidence that the "participation of small-scale farmers in new agri-food supply chains could have positive impacts on small-scale producers", translated into reduced poverty and livelihood enhancement (Blandon *et al.*, 2010:505). This view of Blandon *et al.* is important, as it led to the opinion that for example, suitable skills training can be done that sensitises them to the potentials of information and communication technologies through the usage of information and communication technology (Ekeanyanwu & Okeke, 2010). The first challenge would be to ensure that local communities are trained in the usage of these information and communication technologies or are at least sensitised to use them, as Blandon *et al.* (2010:506) point out that technology based data are often not available, "especially in the context of small-scale producers, who might have limited literacy and no history of record keeping". But what is the viewpoint regarding information and communication technologies with the small-scale producers?

2.6.1 Stance of information and communication technologies in the rural, agricultural sector in South Africa

Theorists (Raslan, 2006; Colle, 2011b; Tengtrakul & Peha, 2011) confirm that it is universally agreed that agri-information is an imperative element in today's agriculture. Supporting this view, is Colle (2011b) who notes that information and communication technology development in the country, paying particular attention to its reach into the rural areas, is being reviewed. Saravan (2011) concurs and mentions that repeated observation indicated the inadequate infrastructure in the rural areas, leading to farmers not having access to

services such as Internet connectivity and therefore these farmers are not exposed to the benefits of the information and communication technologies. Saravan (2011) agrees with Raslan (2006) and Colle (2011b) regarding agriculture and adds that a computer in a farmer's home becomes an access location for other farmers to obtain not only crop and market information but also information on e-education, e-health and other aspects. Various initiatives to employ and utilise these information and communication technologies for development are discussed below.

2.6.2 Initiatives supporting the utilisation of information and communication technologies in the agricultural sector

- The government of South Africa has launched various initiatives to link South Africa and its peoples to the information super-highway. Perhaps the most important initiative was the implementation of the **Government Communication and Information Services** (GCIS) initiative (Van Audenhove, 2001). The GCIS is mandated as the central communication agency of Government. The objective of the GCIS is to encourage South Africans to work together to address challenges, which is critical to the achievement of Vision 2030 (an information society by 2030). Just over 3 000 communication projects have been implemented in the rural areas of the country by using various platforms – reaching more than 23 million rural people since 1994.

- In 1999 the GCIS established the **South African Government On-line Service** with the following two functions: "to give structured access to web-sites of all government departments, and to give access to a databank with all information regarding politics, with structured access to all legislation, political speeches and press releases" (Van Audenhove, 2001:572). The GCIS was also responsible for the "national co-ordination of telecentre initiatives" (Van Audenhove, 2001:596).

- President **Zuma,** in supporting the formation of an accessible and responsive government, established the Presidential hotline in 2009. This hotline was formed in order for the public to lodge queries related to government services and support is offered by a network of liaison officers in national departments, provinces and municipalities. The hotline has served as an important source for the monitoring and evaluation of information for government-wide performance – it enables government to identify issues that are important to citizens and to respond accordingly (South Africa Yearbook 2014).

- Established in 2002, the **Telkom Foundation** provides information and communication technologies, education, infrastructure and community projects and support in rural areas (South Africa, 2009). Welfare projects focusing on the basic needs of people, specifically women, children and disabled people, the Telkom Foundation funds, include Child Line; Life

Line; the United Cerebral Palsy Association of South Africa; SOS Children's Villages; Children in the Wilderness; Alzheimer's SA; St Anne's Catholic Church and the Soweto Association of People with Disabilities.

- In March 2007, government approved the establishment of a new State-owned enterprise (SOE), a government-owned business namely **Infraco**. Infraco provides long-distance connectivity to the country's telecommunications market on a cost basis. Broadband Infraco, which became a stand-alone SOE in January 2008, provides wholesale long-distance access services to remote areas (South Africa, 2009).
- The **Universal and Access Agency of South Africa** (Usaasa) operates under the regulatory and policy framework protected in the Telecommunications Act, 1996 as amended in 2001 and the ministerial policy direction issued in the same year. Usaasa (2009) promotes, facilitates and monitors the implementation of universal service and access in remote areas. It also creates an enabling environment by stimulating public awareness to the benefits of information and communication technology services; makes the necessary interventions to enable remote communities to access information and communication technology services; and also conducts research into and keep abreast of developments in information and communication technology (South Africa, 2009).

Taking the above into consideration, it could be said that the South African government is clearly of the opinion that information and communication technology can provide information for development for the have-not's – especially by means of the newly established GCIS, the Centres of Excellence (CoEs), the recommendations by the Presidential National Commission on Information Society and Development and the support of NEPAD. The South African government appears to pay much attention to information centres in their initiatives to bring information and communication technology especially to the rural, developing communities in South Africa.

2.7 SUMMARY

The previous chapter explained the situation of the development of small-scale, agricultural communities. In this Chapter, special attention was given to the South African context and how information and communication technologies, on which the telecentre is based, could link these remote communities to the information super-highway.

This chapter explored the various aspects regarding the information and communication technologies, on which as telecentre, to be discussed in Chapter 3 is based as follows: In Section 2.2 defining the information and communication technologies, it appeared that these information and communication technologies could include services from basic telephony to Internet connectivity, with Section 2.2.1 discussing the varieties of information and

communication technologies and Section 2.2.2 explaining the services provided by information and communication technologies. Section 2.3 explored literature on the relationship between information and communication technologies and development, with Section 2.3.1 dealing with the characteristics, applicability and usages of information and communication technologies. Section 2.3.2 then explored literature on how the digital divide could be bridged. Section 2.3.3 remarks on the role of information and communication technologies in bridging the digital divide. The role of information and communication technology in order to bridge the digital divide was discussed (both the negative side as well as the positive side) – with special reference to the infrastructure and the infostructure necessary to utilize information and communication technologies in bridging the digital divide: Section 2.4 looked at literature that explain what is needed to successfully employ information and communication technologies, under the sub-headings 2.4.1 infrastructure and 2.4.2 Infostructure. Once the role of infrastructure and infostructure was understood in establishing information and communication technologies delivery mechanisms, Section 2.5 discussed literature on the state of infrastructure and infostructure: Section 2.5.1 debated infrastructure globally; Section 2.5.2 Infostructure globally; Section 2.5.3 Infrastructure in Africa; Section 2.5.4 Infostructure in Africa; Section 2.5.5 Infrastructure in South Africa; and Section 2.5.6 Infostructure in South Africa. By comparing and collating these views and findings of various world renown institutions and organisations with each other as well as the action lines of the WSIS, the outcome was positive to that an constructive information and communication infrastructure as well as infostructure could bridge the digital divide. Section 2.6 finally returned to the issue of information and communication technologies and how it relates to development in the agricultural sector of South Africa.

The discussions and deliberations in this Chapter on the information and communication technologies links this Chapter to the following Chapter, Chapter 3, which argues that the telecentre, which is based on information and communication technologies, could assist and support the rural, developing countries, as well as indigenous peoples of countries (the have-nots of information), to assess, access, manage and disseminate appropriate information that could support development. This could be accomplished in order for these communities to become connected to the information super-highway.

CHAPTER 3 – THE POTENTIAL ROLE OF TELECENTRES IN BRIDGING THE DIGITAL DIVIDE

"We should put the culture back into agriculture"

Lowry (1995:11) United Nations Educational, Scientific and Cultural Organization (UNESCO).

3.1 INTRODUCTION

Chapter 2 explained and described the impact of the information and communication technologies on the development of peoples. The direct link between these information and communication technologies and development, facilitated by infrastructure as well as infostructure such as a telecentre was explained. This Chapter will explore this very specific mechanism, namely the telecentre, which enables communication in order to assist a community in addressing their needs. With the execution of a project focusing on people, it is important to note the participatory approach, concluded from the Ethnographic Paradigm, which should be followed with a project where the community is involved in the development process of their community – throughout the participatory project the information needs, local needs, opinions and viewpoints of the community should be taken into consideration, as promoted by PM&E. Consequently this Chapter will explore various aspects to take into consideration with the participatory project of the establishment of a sustainable telecentre based on information and communication technologies and with the aim of enabling useful, applicable and valuable communication that could lead to development.

Section 3.2 will explain the ethnographic paradigm, from which the participatory approach is concluded. Section 3.3 will explain the concept of a telecentre and how information obtained from the information and communication technologies offered by a telecentre could lead to development with Section 3.3.1 on the functions of telecentres in order to reach the aim of telecentres, Section 3.3.2. on the importance of a participatory needs assessment to identify local needs and Section 3.3.3 on how to become a productive receiver and manager of applicable information for development. Section 3.3.4 will deliberate on the functions of the telecentre in a multi-cultural society. Section 3.4 will deal with information extended to the agricultural telecentre in the developing world, with Section 3.4.1 on conveying appropriate information for development to the agricultural telecentre, and Section 3.4.2 on the compilation and packaging of information for the agricultural telecentre. Section 3.5 will discuss the agricultural telecentre and development with Section 3.5.1 on challenges facing the agricultural telecentre, Section 3.5.2 on the advantages of the agricultural telecentre and Section 3.5.3 on taking the indigenous culture into consideration. Section 3.6 will discuss the actual establishment of a sustainable telecentre. with Section 3.6.1 on factors to be taken into account when establishing a sustainable telecentre, Section 3.6.2 on the potential

of telecentres in assisting development with a sub-section discussing infrastructure and infostructure. Section 3.7 will explain the main purposes of agricultural telecentres, followed by Section 3.8 regarding the challenges of the agricultural telecentre. The chapter will conclude with a summary, conclusions drawn and lessons learnt in section 3.9

3.2 DEFINING THE ETHNOGRAPHIC PARADIGM

The ethnography paradigm, used in a participatory study, is defined as the research process of a group of individuals, such as a community, a society or a population of individuals. The research process is based on observation over a lengthy period of time spent by the researcher among the peoples (Mikkelsen, 1995; De Vos *et al.,* 2001). The aim of the project – the questions to be answered – must guide the selection of methods to be used, not vice versa (Mikkelsen, 1995).

Flick (1998) identifies one of the essential characteristics of interpretative research as taking the perspectives of the participants into consideration. The researcher should analyse his/her role and the effect that his/her participation in the process has had on the research process as the assumption is that the relation between the researcher and the research participants is dynamic (Mikkelsen, 1995). The ethnography is associated with the participatory observation (Henning *et al.,* 2004) by the researcher, in other words applying the participatory research approach.

The view of the World Bank (2012) is important, as it entails that regarding the evaluation process of a participatory project, the World Bank (2012) supports the important role of feedback and remarks that participation is fundamental to the monitoring and evaluation process, since it is more inclusive, and more responsive to the needs and aspirations of the research participants – Participatory Monitoring and Evaluation (PM&E) not only measures the effectiveness of a project, but also empowers beneficiaries and improves performance and outcomes by taking or identifying corrective actions (World Bank, 2012; FAO, 2013).

This Section explained the participatory approach followed for this study. The telecentre, to be established and evaluated according to this participatory approach, is explained in the following Section with Sub-sections.

3.3 TELECENTRES: THE CONCEPT

To ensure a sound understanding of telecentres, an extensive literature search on telecentres and the agricultural environment of these telecentres, involving international and local telecentre models and guidelines, was undertaken. Opinions, viewpoints and disclosures of theorists and researchers found in literature, are discussed in this Section.

Colle and Roman (1999) and Roman and Colle (2006) observe that the purpose of the first telecentres was to combat marginalisation in remote rural areas. These telecentres were established in Scandinavia (Denmark and Sweden) between 1983 and 1985. Soon the initiative spread to Europe, particularly in the United Kingdom (UK) (Anderson *et al.*, 2006; FAO, 2006a) and in 1999 this new phenomenon was well established in "developed countries such as Scandinavia, the UK, the USA, Japan, Canada, Australia, Scotland and Ireland" (Ernberg, 2006:10). Defining telecentres is problematic as so many related terms are used with varying meanings, as Colle and Roman (1999) counted a list with over 30 different names for the telecentre in the late 1900s. This list was expanded with names by various theorists (Conradie, 1998; Perret *et al.*, 2003; Aditya, 2006; Anderson *et al.*, 2006; The United Nations Educational, Scientific and Cultural Organization (UNESCO), 2006; International Development Research Centre (IDRC), 2007). These names include telecottages, multipurpose community centres, community technology centres, digital clubhouses, cabinas publicas, infocentros, telestuben, community access centres, information centres, electronic village halls, telehaus, televillages, virtual village halls, tele-learning centres, Community Multimedia Centres, telephone shops, tele-cottages and even 'telematic centre' (Perret *et al.*, 2003) a centre has been referred to by the farmers in South Arica. These telecentres are also called ICT centres by Alibaygi *et al.* (2011:1189-1190) in the previous Chapter, Chapter 2 (2.3.4.5). These community information centres are initiatives that serve as a place where people can access information from the information and communication technologies, learn new skills and face local social issues and common challenges (Conradie, 1998; Colle & Roman, 1999; Perret *et al.*, 2003; Aditya, 2006; Anderson *et al.*, 2006; UNESCO, 2006; IDRC, 2007a; Rao 2008; Saraei & Amini, 2012). However, since the Development Gateway (2006a) notes that telecentres provide the necessary infrastructure, it could be said that the qualifying feature of telecentres, irrespective of the local name by which it is called, is that they are places that enables communication by means of information and communication technologies to be utilised in order to access (Conradie, 1998), create and disseminate appropriate information.

3.3.1 The aim and functions of telecentres

The aim of the telecentres, based on information and communication technologies, should be to provide, establish, assist, support and maintain communication, with the eventual positive understanding and use of information and communication technologies for obtaining (Feuerstein, 1986; McCarthy, 2006) and disseminating appropriate and needed information, argue Conradie (1998); the Development Gateway (2006a); and Saraei and Amini (2012) – in other words to enable access to applicable, related and relevant communication that could address the information needs of the community. Consequently it could be concluded that

people need and want to be informed in order to be able to take part in their own development – in order to become part of the information society. Obijiofor (2010) cautions that the main question is whether developments in digital technology would address the socio-cultural, economic and political problems of a developing community and agrees to believe that new technologies offer the answer to the problem. Agreeing with the function of information and communication technologies to address problems, Castells (1998) and Colle (2011b) note that the success of the telecentre therefore depends on the ability to develop, improve and expand communication by using information and communication technologies to access and generate appropriate information in order to address the community's ideals and needs (Lekoko, 2010). It could be proposed then that the communities themselves, under leadership of their traditional leaders, should take a leading role in their development. By means of making available communication structures (infrastructure) the telecentre could create and generate applicable content (infostructure) to address the needs of the community it serves and consequently connect the community to the information super-highway (Raslan, 2006; Onuara-Oguno, 2010) by means of the Internet, if affordable.

The qualifying feature of telecentres is that they are places where information and communication technologies could be utilised in order to access (Conradie, 1998), assess, create, manage and disseminate appropriate information. Rogers and Shukla (2008) agree that one strategy for bridging the digital divide is to encourage telecentres which provide *public*, as opposed to *private*, access to the information and communication technologies and in 2011 Alibaygi *et al.* (2011) add to the theory of Rogers and Shukla (2008) that the telecentre is a shared place, based on information and communication technologies which sometimes also includes Internet facilities and training in the usage of the information and communication technologies. The telecentres were also established to create an enabling environment for research and tele-working to increase employment opportunities (Alibaygi *et al.*, 2011). Project leaders involved in the establishment of telecentres should, along with the choice of information and communication technologies, do intensive research on obtaining appropriate information in order to address a specific developing community's needs. Rogers and Shukla's (2008) view is consistent with that of Conradie (1998) who states that research to strengthen the capacity of the information and communication technology in Africa must be customised to address local needs.

3.3.2 Importance of a participatory needs assessment to identify local needs

A participatory needs assessment of the community to be developed should be undertaken (Conradie, 1998; Fuchs 2006; Rao, 2008; Rogers and Shukla, 2008; Colle 2011a, Saraei & Amini, 2012; FAO, 2013). UNESCO (2012) substantiates this view on a participatory needs assessment and notes that in the developing world, UNESCO's (2012) Community

Multimedia Centres (CMC) promote community empowerment by means of enabling communication structures and addressing the local needs. Defending this view, it could be confirmed then that CMCs open the opportunity to active membership in the global information society by combining low-cost, easy-to-operate community radio with public access to the Internet and related information and communication technologies. These telecentres, by means of information and communication technologies inform, educate and entertain, but also give a strong public voice to the voiceless and encourage greater responsibility in concentrating on, dealing with, and addressing their local needs.

James and Ziebell (2003) explain that a telecentre project should focus on people rather than technology, since the effective use of information and communication technologies throughout a community required a change of mind-set of the people. This change could be achieved by people's collaboration in the process of identifying the needs of the community, being consistent with various theorists (Conradie, 1998; Fuchs 2006; Rao, 2008; Rogers & Shukla, 2008; Colle 2011a, Saraei & Amini, 2012; FAO, 2013). These views on people's collaboration are consistent with Nyuykonge (2003) who postulates that an important concern regarding development of a rural community is to identify the information needs of the community, which is similar to the views of several researchers in this field (Lahiff, 2000; Shah *et al*., 2002). Saraei and Amini (2012) urge that it is not only important to understand what a community considers as information – it is also important to enable easy access to information. It could therefore be noted that by means of a well-structured participatory needs assessment, the information needs could be identified and according to these needs the appropriate information and communication technologies, to satisfy these needs, could be obtained, as explained by Feuerstein (1986) and McCarthy (2006).

This Sub-section explained the importance of a participatory needs assessment in the development of peoples. The next Sub-section will entail the importance of managing the information and communication technologies presented by a telecentre in order to enable development.

3.3.3 How to become a productive receiver and manager of applicable information for development

Roman and Colle (2006) note that people still need to focus on learning and sharing knowledge as well as listening to others. Only then can appropriate information be obtained (Feuerstein, 1986; McCarthy, 2006) from the information and communication technologies and only then can a community become productive users of the information and communication technologies. Supporting this view of becoming productive users of the information and communication technologies, Bekenstein (2003), McCarthy (2006) and the

FAO (2013) note that consequently a community can then communicate via the information and communication technologies with work-related organisations in order to support the development of the community by means of acquiring new knowledge. Owing to the dependence of agriculture on rainfall and the inherent uncertainty involved in India, Naik *et al.* (2012) note that farmers need the telecentre for acquiring knowledge regarding their crops, as well as training regarding farming technologies and software – all these services could be integrated and provided by a rural telecentre.

The telecentre can provide access to information and communication technologies which will provide appropriate information necessary for development, as illustrated below:

"Telecentres > Access to information and communication technologies (ICT) > Provide services > Assist development" (Benjamin & Dahms 2004:9).

Based on this chain of events, is the following visual representation of the process through which information and communication technologies could assist the development process. The circles portray how each consecutive phase encompasses the previous phase

Describing the visual presentation below:

1. Establishment of a telecentre which provides access to information and communication technology (Conradie, 1998; FAO, 2006a; Fuchs 2006; McCarthy, 2006; Roman & Colle; 2006; Rogers & Shukla, 2008; Colle, 2011a).

2. The users of the telecentre are then exposed to information and communication technology services where information is created, managed, accessed and assessed (McCarthy, 2006; Roman & Colle, 2006; Rogers & Shukla, 2008; Colle, 2011c).

3. This information obtained (Feuerstein, 1986; McCarthy, 2006) from the information and communication technologies is

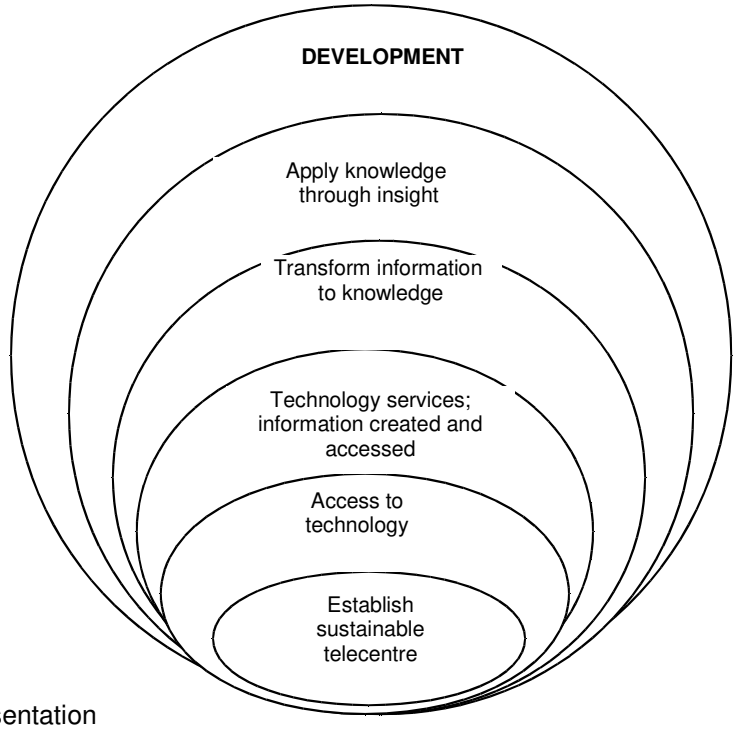
4. Transformed into knowledge (Bekenstein, 2003; FAO, 2006b; McCarthy, 2006) which is applied for, and which leads to

5. Development (Bekenstein, 2003) by means of internalizing the information in performing research and making decisions, according to the following steps, as suggested by Bekenstein (2003):

- reviewing information in order to effectively derive value and meaning;
- referencing metadata if any is available;
- establishing a relevant context, often selecting from many possible contexts;
- deriving new knowledge from the information;

- making decisions or recommendations from the resulting knowledge; applying knowledge enabling ultimate development**.**

Figure 3.1: Development process linked to Telecentres



Source: Author's representation

But there are those who doubt the advantages of telecentres in development contexts. There are many academics and theorists who have access to modern information and communication technologies, who question whether ordinary, mostly poor people in developing countries, really need these information and communication technologies and warn us about its potential harmful effects articulates Ernberg (2006) and also discussed in Section 2.3 in Chapter 2. Behari-Leak's (2010) view concurs that it is the responsibility of the telecentre in the local community to assimilate and adapt the information obtained from the information and communication technologies (Feuerstein, 1986; McCarthy, 2006) into knowledge (Bekenstein, 2003; McCarthy, 2006; FAO, 2013) for its own ends.

This Sub-section described how the telecentre, based on information and communication technologies, could enable information that could lead to development. The telecentre also operating in a multi-cultural society will be discussed in the next Sub-section.

3.3.4 The function of the telecentre in a multi-cultural society

Intercultural communication is essential and vital in any multi-cultural society – more so in a country such as South Africa where various cultural groups meet, live and do business on a daily basis (Behari-Leak, 2010). Behari-Leak (2010) mentions that the skills needed for such communication are not intrinsic to the individual – how peoples make meaning, behave

and understand each other can be learnt in the environment of a telecentre which is supportive and embracing of the many pitfalls that accompany cross-cultural exchanges. UNESCO (2012) validates this view on the purpose of the telecentre to make information understandable (Behari-Leak, 2010) and mentions that UNESCO has also held the Convention for the Protection and Promotion of the Diversity of Cultural Expressions with 116 Parties in 2011. The General Assembly (2012) adds in this regard that UNESCO has developed an online platform in the Solomon Islands to strengthen the communication of indigenous knowledge (Heeks, 1995:141; Moemeka, 2007; Assefa *et al.,* 2010) allowing students and teachers to upload, share and debate community-based knowledge in the Marovo language. The General Assembly (2012) articulates that UNESCO and the Internet Corporation for Assigned Names and Numbers (ICANN) signed a Letter of Intent concerning use of Cyrillic script as well as Arabic-language presence on the Internet, building multilingualism on the Internet.

If the language of the information and communication technologies could be the language of the developing community, community computer programs could address a wide variety of needs and interests, both at a community and individual level (Cisler, 2001). Emberg (2001:1) agrees with the view on addressing the needs and interests of a community (Cisler, 2001), and his important opinion upholds the view that the provision of access to information and communication services in rural and remote areas could be seen as "a key to accelerate their development, particularly in the least developed countries, where the majority of people live in rural areas". Van der Merwe (2007) explains that the application of this principle on a more local level would be in the situation of a WUA in South Africa, established under the National Water Act, 1998 (Act 36 of 1998). All WUAs have the responsibilities that information on certain categories regarding the management of the irrigation scheme, should be provided to the Department of Water Affairs (DWA) on a monthly and annual basis. Van der Merwe (2007) remarks that a computerised billing system, with an extract in the indigenous language, should be developed for irrigation schemes to report to the DWA on monthly accounting and also management information in terms of water used, water use efficiency, and monthly and annual water budgeting. The financial management of the irrigation scheme could also be supported by such a computerised program to submit monthly income generated, arrears, as well as how this should be dealt with.

Igben (2010) substantiates the fact that messages, adapted by the telecentre to the cultural context of the developing community, will be effective in intercultural communication – interaction in the sovereignty of the other person's culture without consideration of one's own cultural context. It is therefore important to ask the question regarding the importance of setting up guidelines for the running of a telecentre, as discussed below in Sub-sections.

3.3.4.1 Managing the multi-cultural telecentre

It could be proposed here that the adaptation of messages into the local language could be made by the manager of the telecentre. Naik *et al.* (2012) concur and explain that, as rural people must travel long distances for services like training and coaching in English, the provision of these services at village telecentres will reduce travelling cost for the rural people as the telecentre will also be situated conveniently closer (Anderson *et al.*, 2006; Naik *et al.,* 2012). James (2010) suggests that an effective and efficient manager could play a pivotal role in establishing mutual understanding between the developing community which is served by the telecentre and the technical data obtained (Feuerstein, 1986; McCarthy, 2006; Bailey & Ngwenyama, 2011) from the information and communication technologies. Supporting this view on the manager translating messages into the indigenous language, it could be observed that this means that the manager as interpreter should possess qualities such as communicative competence and linguistic competence, with a fair understanding of the activities of the rural community the telecentre serves. This could then lead to knowledge regarding the activities of the farmers (Bekenstein, 2003; FAO, 2006a; McCarthy, 2006). But interpreting and clarifying information messages to the indigenous peoples are not the only activities of a manager of a telecentre.

3.3.4.2 Complementary responsibilities of the telecentre for rural development

With the communication links and the information offered by a telecentre, other daily activities undertaken by the manager of a telecentre for the users of the telecentre could include the following: Making and receiving telephone calls world-wide (Benjamin, 2001; Khumalo, 2006) transmitting and receiving faxes to and from anywhere in the world (Khumalo, 2006); making photocopies; using the computer for word processing, spread sheets, presentation applications and more, i.e., information services (Benjamin, 2001; Van Audenhove, 2001; Khumalo, 2006) as well as corresponding by e-mail and searching for information on the Internet. Alibaygi *et al.* (2011) add that managers at rural telecentres must take on other responsibilities in the process of rural development, such as e-commerce and to provide and disseminate agriculture-related information needed by rural communities and farmers. Such information could include information concerning agricultural production and marketing, agricultural subsidies, cooperatives, insurance, finances, and public credits. In other words, the telecentre could generally be seen as a shared facility that provides public access to information and communication technologies (Gómez *et al.*, 2001). Several challenges have also been identified by Heeks (2004), Gillman (2006); Roman and Colle (2006), as applied to the telecentre context by the researcher and which could be summarised as:

- To be able to access and provide relevant information to the rural communities (Heeks, 2004; Roman & Colle, 2006);
- Use of indigenous languages of the rural communities, through the telecentre, as part of culture (Heeks, 2004);
- Researchers of telecentres should have respect for the cultural context of the community researched (Gillman, 2006);
- Illiterate people will hesitate to use technology, which is called technophobia (Gillman, 2006; Roman & Colle, 2006).

The discussion on the context, the functions and responsibilities of the telecentre, with reference to the multi-cultural telecentre in this Section, directs the study to the following Section with Sub-sections comprising the role of the telecentre in development regarding the agricultural sector.

3.4 INFORMATION EXTENDED TO THE AGRICULTURAL TELECENTRE IN THE DEVELOPING WORLD

Obijiofor (2009) proposes that in rural communities of Africa, access to new technologies such as computers, mobile phones and the Internet would provide a producer in a developing community of arts and crafts global reach for advertising his or her products via the Internet. Access to the global audience would transform and internationalise the extent and capacity of business: The local producer could receive and take phone orders for his/her products without leaving the village (Hudson, 2006). Supporting this view on locality, it could be mentioned that increased business would also impact positively on job opportunities available in the village. Theorists (Anderson *et al.*, 2006; Naik *et al.,* 2012) agree to the contribution of information and communication technologies (Hudson, 2006) and add that information and communication technologies contribute to equity by enabling the disadvantaged, including the poor, isolated rural people as well as the disabled, to obtain information electronically (Feuerstein, 1986; McCarthy, 2006) by means of e-medicine in order to help distant specialists to diagnose conditions and recommend treatment.

Regarding agriculture on the international front, Heeks (1995) articulates that agriculture in many rural areas of developing countries has moved beyond subsistence farming and that technology provides income and employment – playing a pivotal role in poverty alleviation. For this reason information and communication technology is often seen as the key to improving and enhancing agricultural production (Heeks, 1995). Naik *et al.* (2012) agree with Heeks (1995) but argue, though, that a farmer requires many services at various stages of crop production. At the beginning of the season, the farmer needs crop advisory services

related to seeds, fertilisers, type of crop, and soil testing and as the production progresses until harvesting time, information needs change, also from season to season. Naik *et al.* (2012) point out that due to the dependence of agriculture in India on rainfall and the inherent uncertainty involved, farmers need crop insurance as well. This is in line with the water-scarce situation in South Africa, as posited by researchers (Kirsten & Van Zyl, 1998). Farmers also have many training needs regarding farming technologies. All these services can be integrated and provided by the telecentre. The telecentre can also become the interface for farmers and businesses buying the produce.

From the preceding literature it may be concluded that bringing telecentres to the rural, agricultural areas can contribute to increased agricultural output, as telecentres provide the necessary information and communication technologies for agri-related development such as availability and cost of agricultural inputs, as well as the information and communication technologies used for production and processing of agricultural goods (FAO, 2006a). Vriens (2004) cautions, though, that rural people need to be guided in their information literacy in the same way in which we educate them in the traditional literacy of reading paper texts. The aim of the agriculture-related telecentre is the provision of communication which would include socio-economic (Attwood *et al.,* 2013) as well as agriculture-related information. Therefore the developing countries and rural areas benefit from the telecentre which expands access to information and communication technology service; presents public services such as education, health and social services; provides information of general interest to the local community, including information to specific groups such as farmers, local businesses and NGOs; and provides access to infrastructure, technology support and advice for the development of businesses, as Rao (2008) explains regarding social development in rural India.

In this Section the background on the agricultural telecentre for developing communities was presented which leads now to the kind of information that should be presented to the developing peoples – information that could lead to the development of the peoples of the agricultural telecentre.

3.4.1 Conveying appropriate information for development to the agricultural telecentre

In this Sub-section the type of information that should reach the agricultural telecentre, as well as how and by whom will be explored and discussed.

The organisation Information for Development (I4D) (2006b) states that several innovative initiatives have been made in the direction of agriculture where telecentres are becoming a one-stop location for agri-information for the farmers to take adaptive and timely decisions.

Organisations and researchers in most countries have for long been involved in generating excellent knowledge on agriculture, which, if made available, could benefit the farmers in making informed decisions regarding improvement of cropping pattern and increasing yields. Regarding this rural, agricultural sphere, Naik *et al.* (2012) from India also propose that across the world, the rural peoples live in remote areas with sparse populations which implies that access to quality services for the rural peoples is constrained by distance and high travelling costs – problems which could be addressed by well placed-telecentres for stimulating demand for services such as information and communication technologies providing much needed information and making them affordable. For the farmers, information on seeds, weather and farming practices is important (i4d, 2006a). In India, the national and sub-national governments have supported businesses to establish telecentres in rural areas to provide information-technology enabled services. Naik *et al.* (2012) proposes that in the developing world, the peoples prefer telecentres to provide e-governance, because of low e-literacy, individual ownership of computer and Internet penetration and that currently entrepreneurs are investigating various business types to provide such services in rural areas. Thomas, also from India, proposes in 2009 (Thomas, 2009) that access to information also leads to the enhancement of social change since:

- The right to information is a foundational right that enables other rights such as the right to food security, to employment, to health;
- The right to information enhances the quality of being a citizen; and
- The right to information strengthens accountability and transparency.

The developing small-scale farmers still face many problems regarding appropriate information, as very few have access to information and communication technologies in order to access this information that can lead to development and have to rely on the following, which could be enhanced by means of a telecentre:

- **Extension Officers:** O'Farrell and Norrish (1999) articulate that many developing small-scale farmers depend on information obtained from Extension Officers and warn warn that these Extension Officers are, in many cases, not informed sufficiently on new farming practices, market prices and market trends. This information is neither reliable nor sufficient, as much extension information has been found to be out of date, irrelevant and not applicable to developing farmers' needs (O'Farrell & Norrish, 1999). Nageswara (2006) agrees that developing farmers need appropriate information on the choice of crops, price of produce, pesticides, fertilisers, and climatic change. It could be concluded that by means of information and communication technologies provided by

telecentres, these farmers can be exposed to this relevant information regarding their farming practices.

- **Managers:** Information received by telecentres can be disseminated to farmers via other communication media such as cell phones, in writing or by word of mouth by the managers of telecentres. On theorizing culture, Ekeanyanwu (2010) is of the opinion that managers, acting as interpreters, are required to possess certain qualities. One of such qualities includes communicative competence and secondly, linguistic competence for the indigenous peoples. Kasemsuk (2011) explains that this personal communication has the advantages of interaction and immediate feedback. This implies that the farmers at the agricultural telecentre could receive immediate warnings of drought and veld-fires, or could be advised on which crops to grow the coming season in order to start cultivating their land. This indicates that managers of telecentres should ensure that information reaches the farmers, as the farmer remains the direct beneficiary of the information itself (Accascina, 2006). Regarding these managers, Roman and Colle (2006) add that without knowledgeable, community orientated telecentre managers who really want to share the tools of the Information Society, no telecentre can hope to succeed. But Colle and Roman, (1999) also caution that some personnel may only contribute to the day-in and day-out supervision of the telecentre – a potential personnel expense that many could not otherwise afford. On the topic of the telecentre manager, Harris (2003) promotes the manager as a volunteer and mentions that the volunteer, however, has deeper significance: They provide telecentre clientele with personal models with whom they can identify and feel comfortable.
- **Mobile phone:** Hwang (2011) remarks that the positive economic impact of mobile phones is so profound that it creates personal and collective success from the bottom up. Hwang (2011) comments that the mobile phone, as an interpersonal medium, therefore contributes to the reinforcement of the information and communication technology network structure. Although this point is perhaps less dramatic when applied to innovations beyond mobile phones it still seems that technology allows ordinary people to become more productive users, it gains economic power , usage increases widely as it fulfills a cycle of prosperity. Quadir (2010) has examples of the mobile-phone playing an important role, as information gathered by mobile phone allowed farmers in Senegal, for instance, to double the price they got for their crops; Kenya's M-Pesa is facilitating mobile banking transactions; Bangladesh's CellBazaar is connecting buyers to sellers in a sort of mobile Craigs List; and in Haiti, Ushahidi is using crowd-sourcing to aggregate information for crisis response (Ramaswamy,

2011). A number of telemedicine initiatives across the developing world are bringing better healthcare to underserved areas and mPedigree is using cell phones to tackle fake drugs in Africa (Ramaswamy, 2011).

Cell phones (Colle, 2011a) have emerged as a leading leapfrog technology in rural areas with very limited landline penetration, in part due to the economic incentives for digging up copper wire and selling it. The developing small-scale farmers are now experiencing a cell phone explosion. If a telecentre could provide such a service like the cell phone, farmers would be in contact with the telecentre by means of phoning the telecentre from wherever the farmer might be busy with his farming activities. Crucial information can be disseminated from the telecentre to the farmers – on floods, veld fires, locust plagues, etc.

- **Global Positioning System (GPS):** Herders in Angola track their cattle via GPS, which could for instance be one of the services rendered by a telecentre (OneWorld Radio, 2006). In South Africa, where Precision Agriculture is practised, irrigation farmers apply the GPS where fertilisers, pesticides and irrigation water are distributed according to information provided by the GPS, in order to ensure that the application of water and fertilisers is in accordance with the specific needs of the crops, soil types and water requirements, applied through the specific irrigation system (Van der Merwe, 2007). Precision Agriculture as applied world-wide is a farming management concept with the goal of optimising inputs according to geo-spatial information provided through satellite technology. The GPS is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the US Department of Defence. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. Although there are no subscription fees or setup charges to use GPS, the GPS operates in any weather conditions, anywhere in the world, 24 hours a day (OneWorld Radio, 2006).
- **Geographical information systems**: According to CTA (2006) there have been only very limited applications of geographical information systems (GIS) to urban food production activities globally. The GIS plots rural agricultural areas by means of analysing aerial photographs with field work and GIS, enabling rural farmers to receive additional support from various stakeholders regarding questions on their irrigation and land tenure, their water supply, infrastructure as well as extension services.

This Sub-section deliberated on how applicable information could reach the rural agricultural telecentre. But how could this information be satisfactorily compiled and structured as well as adequately and sufficiently packaged. These aspects are discussed in the following Sub-section.

3.4.2 Compilation and packaging of information for the agricultural telecentre

Information reaching the telecentre in the developing agricultural sector should be compiled in an easy-to-understand way – preferably in the indigenous language, with codes such as pictures and sketches (Fuchs, 2006). Shearman (2003:21) agrees with the benefit of using codes (Fuchs, 2006) and suggests that "community arts, oral histories, reminiscence work, virtual galleries and community reporting are all proven ways of how information and communication technologies could be used to increase people's levels of self-confidence and creative capacity". It could be agreed then with Ernberg (2006) that people in the developing agricultural sector are mostly illiterate and information should be explained by word of mouth as well as integrated with the indigenous communication systems of the farmers - the indigenous communication system of illiterate farmers is by word of mouth (FAO, 2006a). In other words, information obtained (Feuerstein, 1986; McCarthy, 2006) from the information and communication technologies should also be packaged in a way that it could be understood and comprehended by the developing agricultural community (Sturges & Neill, 1998; Colle & Roman, 1999; Shearman, 2003) in order for the information to be converted into the application of knowledge, as cautioned by Bekenstein (2003), FAO (2006a) and McCarthy (2006).

The modus on how information reaches the agricultural telecentre in the developing world with reference to the role of the telecentre was discussed, which leads to the next aspect, namely the role of the agricultural telecentre in the development process. This aspect is discussed in the next Section with Sub-sections.

3.5 THE AGRICULTURAL TELECENTRE AND DEVELOPMENT

This Section explores the establishment of the rural agricultural telecentre and considers whether such a telecentre could overcome its challenges by making optimum use of its advantages and values.

The practice of establishing agriculture-related telecentres has grown and expanded which led to the fact that international development agencies, non-governmental organisations (NGOs) and government institutions have bought into the concept and have initiated telecentres in rural areas all over the world (Thamizoli & Balasubramanian, 2002). The most important function and purpose of the telecentre was to connect the developing countries to the information super-highway (Ernberg, 2001; Development Gateway, 2006; Saraei &

Amini, 2012) in order to address socio-economic and information needs. Supporting this view, Roman and Colle (2006) record that even Hungary, a former socialist country, has developed a telecottage system for its rural areas in order to develop and support its rural peoples. But it is important to note that Alibaygi *et al.* (2010) from Iran caution that, even though rural information and communication technology centres play an important role in rural development by means of improving e-governance in rural areas, the rural people need to understand this rapid development and need to be made aware of the social structure at work and at home. Regarding the agricultural sector in South Africa it could be remarked that telecentres have the potential to connect the farmers to the information super-highway (Ernberg, 2006; Development Gateway, 2006a; Saraei & Amini, 2012), if the farmers could afford the Internet connection. Various vital systems such as management systems, financial systems and infrastructure maintenance could be computerised at an agricultural telecentre. In South Arica this could mean that the information and communication technologies could support an irrigation scheme to calculate water-related issues for the compilation of management documents; communication with the Provincial Department of Agriculture as well as the DWA and other agriculture-related organisations. The telecentre could therefore address the agriculture-related needs as well as the socio-economic and ICT information needs of the farmers with its surrounding communities, as pointed out by Stimie *et al.* (2001); Tapela, (2005); Van Averbeke (2006); Van der Merwe (2007).

It could be accepted that telecentres could be successfully introduced and established in developing countries especially for the development of rural communities (Vasanthi, 2011). Van der Merwe (2007) from South Africa adds that the agricultural telecentres will be of high significance for a WUA established through the NWA, in order to fulfil its responsibilities in terms of the NWA more effectively and efficiently by means of the information and communication technologies offered by the telecentres. This will include the geographical area managed by the WUA, the water resources involved and the conditions and limitations connected to the water management of the irrigation scheme.

The views and beliefs of theorists and researchers provide confirmation of the core role that a telecentre can play in the development aspect of rural communities (Vasanthi, 2011). Theorists such as Delgadillo and Borja (2001); Gomez *et al.* (2001a); Benjamin and Dahms (2004) and Latchem and Walker (2006) agree that telecentres provide the technology and explain that telecentres have considerable potential for narrowing the digital divide in remote, rural and disadvantaged communities since they provide facilities to communicate with the outside world – especially regarding market information as advocated by Qvortrup (2001) as well as much needed information on farming practices. Via the telecentre, information could reach the farmers by means of the telephone, e-mail and fax (Benjamin & Dahms, 2004;

Heeks, 2004; Painting, 2004) – the infrastructure as the information and communication technologies are referred to by the Development Gateway (2006) and Painting (2004). On the negative side, Ray (1998) points out that it is the lack of information that negatively affects the development process in the rural sector. This could be overcome by telecentres that provide the technology, as advised by Kiplang'at (2004).

Regarding the information disseminated by the rural telecentre, Goméz *et al.* (2001) are of the opinion that telecentres provide access to relevant education, government information, healthcare and other services, and according to Latchem and Walker (2006) the telecentre also supports the social and economical development – which forms the infostructure, as described by Nageswara (2006).

This Section provided a holistic view on the pivotal role that a telecentre could play in the development of a rural community. To follow is the first Sub-section which will explain the challenges that are faced by the telecentres in the agricultural sector.

3.5.1 Challenges facing the agricultural telecentre

Although South Africa has by far the most sophisticated telecentre networks and available research on telecentres in Africa it has its own domestic problems regarding the agricultural sector:

- South Africa currently does not have any 'best practice' prototype to which it can refer should it wish to establish telecentres for development (Stimie *et al.*, 2001). The only other example of its kind was in Mamelodi near Pretoria, but failed after financial support was withdrawn.
- The problem in South Africa, with special reference to the former homelands in South Africa, is however, that farmers at these small-scale irrigation schemes have limited access to land and capital (Lahiff, 2000; Shah *et al.*, 2002; Van Averbeke, 2006) – let alone technology. These small-scale irrigation schemes are not supported adequately and there are only insufficient extensions and marketing support services available (Stimie *et al.*, 2001; Tapela, 2005; Van Averbeke, 2006). This has limited their ability to grow and has resulted in an undue reliance to a greater or lesser extent on subsistence production. With the introduction of information and communication technologies, the agricultural telecentre in South Africa could be in an excellent position to abide by the rules of the NWA, to report to the DWA on the following aspects (DWA, 1998):

  - Day-to-day management information including the amount of water used daily/weekly per farmer and financial information regarding payment of water bills (electronic computerised billing system);

- According to the WUAs' Water Management Plan, certain aspects of the plan have to be reported annually to the DWA. These include the amount of water used, losses, progress with water conservation management and the implementation of Best Management Practices (computerised billing system);
- Correspondence regarding elections and representation of different population groups (computerised GIS);
- Correspondence regarding the management and administration of the WUA. (Internet availability and e-mail correspondence).

It is described how these problematic issues are addressed in Chapter 7 which covers Phase 3, the Implementation Phase where the financial system was computerised. An important challenge to take into consideration with the agricultural telecentre at a WUA however, is that the indigenous communication system is by word of mouth.

This leads to the issue that interpretation and translation of messages received from the information and communication technologies represent a "convergence of cultural differences and divide" (Igben, 2010:422). This poses a problem because the information and communication technologies are not merely facilitators of communication, but anchors for establishing mutual understanding between role-players, especially those linguistically distant from the language of the information and communication technologies when the language of the information and communication technologies does not correspond with their indigenous language. It is therefore important to note, as will be explained in a following section, that the manager of the telecentre should be skilled in the language of the information and communication technologies, as well as in that of the community (Martin & Rader, 2003; Rao, 2008). The manager will have to translate the messages from the information and communication technologies to the farmers, the community as well as the Extension Officers that must guide the farmers in their farming practices, as explained earlier in this chapter in Section 3.3.4.

Telecentres assist and sustain agriculture development by supporting and assisting two-way communication between farmers; by networking for solutions for local problems solving; and managing natural resource (Shah *et al.*, 2002; Van Averbeke, 2006). Thamizoli and Balasubramanian (2002) agree and suggest that though familiarity of conventional practices exists within farmers through media information, they require details on important matters such as: Managing diseases and pests; prevailing market price of the crops; mechanisation and irrigation, and livestock management. The expertise and information available elsewhere, are, though, rapidly disseminated to the local farming community through The telecentre swiftly disseminates the expertise and information to the local farming community,

ensuring timely details on the prices, arrivals and market trends for trading of their produce, without the involvement of the middleman (UNESCO, 2011). Rural and remote infrastructures are formed by integrating these isolated communities into the information network. Socio-economic development of the peoples is supported as useful information on educational matters, occupation, land-holding by farmers, variety of crops cultivated, crop and livestock production, marketing constraints etc., are made available within reach. .

This Sub-section gave an overview of the challenges faced by the agriculture-related telecentres in South Africa and on the international front. On a more positive note, the next Sub-section will discuss the advantages of the agricultural telecentre.

3.5.2 Advantages of the agricultural telecentre

The practice of establishing rural telecentres has emerged as an important strategy for bridging the digital divide in the rural areas of developing countries and international development agencies, non-governmental organisations (NGOs) and government institutions have bought into the concept and initiated telecentres in rural areas all over the world (Thamizoli & Balasubramanian, 2002). Agreeing with the initiation of telecentres in rural areas, Vasanthi (2011) comments that not only have these agencies and organisations realised the importance of communicating information, but economists in the economic sector also realise the importance of information. The views of several South African researchers (Stimie *et al.*, 2001; Tapela, 2005; Van Averbeke, 2006; Van der Merwe 2007) are important as they agree that the lack of information affects the development process in the rural sector of South Africa. These researchers (Stimie *et al.*, 2001; Tapela, 2005; Van Averbeke, 2006; Van der Merwe 2007) argue that since telecentres are generally seen as tools that can facilitate the flow of information in rural areas and help reduce costs of food and sometimes even water, in the rural economy, the telecentre is seen as a tool towards social and economic growth (IDRC, 2000a). Kiplang'at (2004) agrees on this view regarding the telecentre being an important tool in development and mentions that the telecentre is a model of technology provision in the rural areas of developing countries. This is in line with Vriens (2004) who is of the opinion that knowledge sharing, or dissemination, is to make sure that (existing) knowledge gets to the right place in the telecentre management. Many theorists (Feuerstein, 1986; Vriens, 2004; McCarthy, 2006; Bailey & Ngwenyama, 2011) refer to the process of storing, retrieving and applying agriculture-related knowledge at an institution such as a telecentre, as the application of the information and communication technologies by the manager of the telecentre.

The fact that the agricultural telecentre excludes the middle-man and cooperates directly with companies in order to offer subsidised agricultural seeds (Saraei & Amini, 2012), means

that the telecentre connects the farmers directly to the information super-highway. Vasanthi (2011) adds that this 'anytime-anywhere' advantage of the agricultural telecentre ensures efficient prices as well as cost-effective agricultural transactions for the farming community. The information on grain price is important to farmers, especially to women who receive part of their wages in grain. Thus many rural developmental organizations support these telecentres which leads to the implementation of appropriate websites for the agricultural population (Saraei & Amini, 2012).

This Sub-section described how the agriculture-related telecentre could not only provide applicable agriculture-related knowledge, but also play a definite role in bridging the digital divide. To incorporate the aspect of handling of indigenous culture, the next Sub-section will look into by the agriculture-related telecentre handling the aspect of culture.

3.5.3 Taking into consideration the indigenous culture

As part of indigenous culture, Jayaweera and Amunugama (1989), Fuchs (2006) and Lekoko (2010:60) found that the "customs, values, needs and traditions" of the people to be developed should be taken into consideration in the development process. Lowry (1995:11), also referring to the agricultural sector, mentions the aphorism which states that "if we put the culture back into agriculture, perhaps the rural poor will get the chance to be the authors of their own development". Demand-driven telecentres also address the need to have relevant and useful content – but much of the information available via information and communication technologies may not meet communities' needs for local and localised information on agriculture and nearby markets (Colle & Roman, 1999). Regarding the teaching, Heeks (1995) also foresees that a challenge to students in the agricultural sector will be to incorporate farmers' indigenous knowledge (Heeks, 1995:141; Moemeka, 2007; Assefa *et al.,* 2010) into their research. Codes, as mentioned by Fuchs (2006) such as sketches, should also be used in order for illiterate farmers to comprehend the meaning and identify with the questions of a questionnaire or an interview schedule for an assessment, which is a first-world concept.

This Sub-section explained the importance of the consideration of the indigenous language – not only by the agriculture-related telecentre, but also by researchers. To follow is an exploration of the financial support, or the lack thereof, to the agriculture-related telecentre.

3.5.4 Financial support to the agricultural telecentre

The question is often asked, and rightly so, how a modern concept such as information and communication technologies could also be successfully located in telecentres, in a developing continent such as Africa (Van Averbeke, 2006). Although Heeks (1995) is of the opinion that agriculture in many rural areas of developing countries has moved beyond

subsistence farming, and technology therefore plays a vital role in poverty alleviation by providing income and employment, the establishment of an intervention (Crosby *et al.*, 2000) such as an agricultural telecentre is not as unambiguous as it may seem. Colle and Roman (1999:78) add that most telecentres operate in a "not-for-profit mode, but that does not mean not-for-income". Typically donor agencies reduce or discontinue financial support to telecentres after an initial incubation period. Gumucio-Dagron (2001) agrees that donors donate only a once-off grant for the establishment of telecentres and argues that telecentres that have a mandate to contribute to the community's welfare should not be responsible for their own full financial support any more than a community library. Ramaswamy (2011) concurs that sustainability could be achieved with the assistance of farmers by encouraging donors to widen the current basic and important limitations of funding for development.

This channels the discussion to a comparison between the sustainability of the agricultural telecentre in the next Sub-section.

3.5.5 Comparing the rural small-scale agricultural telecentre with telecentres found in literature, with special reference to sustainability

In this Sub-section a small-scale rural agricultural telecentre, situated in the Limpopo Province (referred to as the rural agricultural telecentre in this Sub-section) will be compared to telecentres in South Africa as well as telecentres in Africa and Eastern Europe. This rural agricultural telecentre is chosen for this study as it is the first rural agricultural telecentre in South Africa and also because it is situated at the first small-scale WUA established in South Africa – it therefore represents a good picture of the situation of the rural small-scale agricultural telecentres in South Africa.

The purpose of this Sub-section is to distinguish between the various aspects regarding the establishment and the management of the rural small-scale agricultural telecentre in South Africa and those in the relevant literature. The rural agricultural telecentres in South Africa may or may not obtain a donation from the Department of Agriculture for the establishment of the telecentre. If obtained, most of these donations merely cover the accommodation and the travelling costs of the researcher. The information and communication technologies (mostly the computer without Internet connectivity and a multifunctional printer) used at rural agricultural telecentres will have to be bought with funds obtained from donors. As PM&E urges the importance of taking the environment of the telecentre into consideration, it is important to note that the harsh environment (Mikkelsen, 1995; Berg, 1998) such as in South Africa, with only promises from government to revitalise these irrigation schemes, the rural irrigation schemes in the Limpopo Province as well as other irrigation schemes situated in former homelands will mostly come to a standstill at some stage due to drought conditions.

Below are the differences and corresponding similarities between the rural agricultural telecentre at a small-scale irrigation scheme in the Giyane district compared to nine other telecentres:

- The **Nakaseke telecentre** is located in the Luwero District north of Kampala. This was their first rural telecentre. It was a project of a number of national and international donors, namely IDRC Acacia, the ITU and UNESCO, among others. Government and donors played a decisive role in the establishment of this telecentre, which is lacking in a rural agricultural telecentre. This just again emphasises the pivotal role government plays in the establishment of a telecentre. Most of the rural agricultural telecentres receive only a small amount from the DAFF (mostly for man-hours of the researcher) in the establishment, and the farmers will have to buy the information and communication technologies with donor funds**.** The Library of the Nakaseke telecentre is equipped with dictionaries, assistant librarians, books on various topics and newspapers, bought with funds obtained from government and NGO's. The rural agricultural telecentre library consists of mostly manuals, pamphlets and booklets obtained free of charge from the DAFF. The secretary must, though, subscribe to *AgriNews* (mouthpiece of the DAFF) and *NuFarmer* (a newspaper aimed at the small-scale farmer) which they can receive free of charge. There will be no funds to equip the library with any publications to be bought. The Nakaseke telecentre has three extra computers to be used. The rural agricultural telecentre will at most be equipped with only one computer, to be operated by the secretary. Software in the Nakaseke telecentre comprises e-mail and the Internet. This will lack at a rural agricultural telecentre, as there will not be enough funds to subscribe to Internet.

Many of the farmers and the members of the surrounding communities of the rural agricultural telecentre will be illiterate. Illiteracy means that a person is unable to read and write. However, such a person can also receive information by other means, such as by word of mouth and learning from ancestors through practical training practices. At the rural agricultural telecentre these illiterate farmers will be able to understand the information on their farming practices transferred and translated to them by the secretary and the Extension Officers. This information can be obtained (Bekenstein, 2003; FAO, 2006a; McCarthy, 2006) from the library as well as from the cooperatives, agriculture-related organisations and Departments.

- The Universal Service Agency (**USA**) is mandated by the Department of Communication in South Arica to establish telecentres countrywide. Many users of the telecentres of the USA in South Africa mentioned infrastructure as an impediment such as non-availability of electricity (Mankweng); erratic power supply (Botlokwa and Phalala); the non-

availability of telephone lines (Thakgalane) and non-functional equipment (Mankweng, Thakalage and Bakgaga-ba-Mothapo) (IDRC, 2007b). The USA telecentres were established with financial support from the IDRC, and the cost of establishing a telecentre in South Africa was said to be approximately R400 000 (USA, 2007). The rural agricultural telecentre usually obtains financial assistance of approximately R64 000 from the DAFF to cover the man-hours (including accommodation and travel expenses) of the researcher. The information and communication technologies have to be bought with funds obtained from donors.

The difference between the USA telecentres in South Africa and the rural agricultural telecentre is that the USA telecentres are established as 'boxes from the sky' as previously mentioned (Benjamin, 2006). No research was undertaken regarding the needs of the community, as urged by PM&E, which led to the failure of most of the telecentres. With the rural agricultural telecentre, the agriculture-related information needs as well as the socio-economic and ICT needs of the community were researched and investigated to be addressed, as the study was undertaken according to the participatory school, where PM&E advises the assessment of the needs of the community to be investigated. The success of the rural agricultural telecentre was that, according to the agriculture-related information needs as well as the socio-economic and ICT needs, the appropriate technologies could be identified and bought to address these needs. Where the USA telecentres are established without any involvement or participation from the community, the research participants (farmers) of the rural agricultural telecentre must be involved and engaged from its inception, and participate in all discussions and decisions made, as promoted by PM&E.

- As with the USA telecentres, the telecentres in **Uganda** were established by government under the Communications Act of 1997, mandated to establish the Rural Communications Development Fund (RCDF) as the means to achieve universal access. The RCDF controls and regulates the investments of the private sector (service providers and investors) and non-governmental organisations (NGO's) into rural communication services. In 2002, the fund obtained a US$5-million grant from the World Bank to encourage and assist with the establishment of public phone centres and access points in rural districts. A national ICT Policy infrastructure (UNCST 2001) and a rural communications development policy (infostructure) (UCC 2001) have been drafted to be approved by parliament and laid down into law. Telecentres in Uganda are situated in public community centres or in government buildings. The rural agricultural telecentre is situated at a WUA, in a remote area at an irrigation scheme.

- In the 1980's, in **Senegal**, average annual investments in the sector exceeded FCFA 18 billion. In 1996, the telecom sector directly contributed to a 2.6% increase in the GDP. In

addition, it acted as a driving force for other national economic activities. The costs of the information and communication technologies at a rural agricultural telecentre are approximately R20 000, as it will comprise only a computer, without Internet facilities and a multifunctional printer.

- Despite the impressive statistics in **Senegal,** telecommunication services are not accessible to all because of the level of infrastructure development in the rural areas and poverty, which makes it difficult to pay for services. As in Uganda, the government plays a pivotal role in the establishment, maintenance and support of its telecentres. As mentioned above, there is usually, apart from the small amount of funds for the establishment costs, no real financial support from government for the management and operation of the rural agricultural telecentre.

From the above it is clear that international telecentres are established with funds from government. Apart from the minimum funds initially obtained from the DAFF, no further funds were obtained from government to establish, maintain and manage the rural agricultural telecentre. But there are also more important differences between the telecentres as described above, and those in the rural developing agricultural sector in South Africa. These differences can be summarised as follows:

- **Important influence of the environment on the telecentre**

PM&E stresses the critical role that the environment plays in any project undertaken. It is consequently important to note that the most important difference between the establishment and evaluation of a telecentre in the developing agricultural sector in South Africa and those evaluated by theorists and researchers, is the fact that a small-scale irrigation community in South Africa has only one source of income, namely their irrigation produce. If that fails for whatever reason, none of their other activities can proceed. Mikkelsen (1995) and Berg (1998), both theorists of the PM&E school, question the influence of the environment on the project. There are at least eight requirements for any irrigation scheme to be successful (Denison & Monana, 2007). These are:

- Institutional structure (WUA);
- Natural resources (water, soil, climate);
- Capital and financial support (Access to capital and financial support);
- Infrastructure (dams, canals, weirs, pumps, power supply, roads, fences);
- Production skills and know-how (knowledge of farming including the indigenous system and knowledge);

- Farming systems
- Markets (local and national markets); and
- Support structures (commercial supply of seed, fertiliser, mechanisation parts, irrigation equipment, extension services).

In the case of the rural agricultural telecentre in the Limpopo Province, some of the requirements are met such as the WUA and the telecentre as a support service, but several other requirements (water) and capital and financial support are not met. In the absence of these requirements, no matter how successful the telecentre is, the economic prospects of the scheme will fail. If there are no economic prospects, all agricultural activities will come to a standstill and there will be no funds to use the telecentre.

The role of the agricultural telecentre in development with its advantages and the role of the indigenous culture, as well as the lack of financial support to these centres, were discussed, which now leads to the problem of establishing such a sustainable telecentre within the context of the above challenges.

3.6 ESTABLISHING A SUSTAINABLE TELECENTRE

Proenza (2001) suggests that telecentres should be more rigorous about adopting business models for financial income. South African as well as international experts in the sustainability and economical environment of South African vs. international small-scale irrigation schemes are explained and discussed in detail under Definition of Terms in Chapter 1 in Section 1.5. Important to note for this study, is that the South African telecentres at small-scale irrigation schemes have to function in a water-scarce country with harsh, unconducive circumstances and environment (Perret *et al*., 2003).

Establishing an intervention such as a sustainable telecentre is not as straightforward as it may seem. Regarding sustainability, the view of Harris (2003) is important to note, as he explains that the sustainability of a telecentre cannot be assessed adequately unless several factors are given due consideration. This important view of Harris (2003) led to many researchers of the participatory school, such as Harris (2003); Colle (2006); Fundacion Chasquinet (2006); Stoll (2006); and McConnel (2007) agreeing that telecentre sustainability cannot be viewed on the basis of financial sustainability alone. Harris (2003) notes that these factors regarding the sustainability of a telecentre have their own dynamics, could come and go and would continue to exercise their influence in varying degrees over time after the establishment of a telecentre. Fundacion Chasquinet (2006) notes that in order to reach the goals of community development and financial sustainability, telecentres have to integrate these factors, namely social, political, cultural and technical sustainability as vital

elements in the planning and operation of the telecentre. The views of various theorists and researchers are collated and discussed below:

- **Social and cultural sustainability:**
    - To be lasting and viable, the telecentre must take into consideration the social and cultural context in which the telecentre operates. The telecentre must respond appropriately to the cultural context (Harris, 2003; Fundacion Chasquinet, 2006).
    - This includes consideration of social and historical characteristics, pressing needs as well as levels of education and literacy. If people in the community feel themselves empowered by the telecentre, they will be more active in the operation thereof (McConnel, 2007).
    - Since men and women have different needs when it comes to telecentres they will distinguish different possibilities and interests with regard to their use of the telecentre (McConnel, 2007).
    - Similarly, youths and adults have different outlooks, the operation of a telecentre in an urban setting differs vastly from the telecentre in an indigenous developing community, says Stoll (2006). If the telecentre does not accept these differences in its management, it will be neither socially nor culturally sustainable (Fundacion Chasquinet, 2006).
- **Political sustainability**:
    - Stoll (2006) is of the opinion that political sustainability refers to be able to address the needs of the poorest sectors by securing a regulatory framework that will protect, promote and support community telecentres and their activities.
    - It includes factors such as participatory mechanisms, political networking as well as local power relationships (Colle, 2006).
    - As telecentres and their sustainability are based on the community, the role of government is not to impose a telecentre on a community, but rather to address the needs of the community by creating the conditions that allow community telecentres to develop mechanisms for the development of its community (Harris, 2003; Colle, 2006; Fundacion Chasquinet, 2006; McConnel, 2007).

- **Technological sustainability:**
    - Technological sustainability means the support and the provision of information and communication technologies which do not necessarily need to be on hand constantly, provided it is a locally available service that is sufficiently responsive (Fundacion Chasquinet, 2006).
    - Most rural, subsistence societies with low population density are based on technological strategies and social activities that guarantee human survival in the same area for millennia (***Giampietro***, 2011).
    - Many researchers such as Harris (2003); Colle (2006); Fundacion Chasquinet (2006); Stoll (2006) and McConnel (2007) emphasise that although telecentres do not generally need to operate with the latest information and communication technologies, it is important that they have a clear plan for ensuring their technological sustainability.
    - According to Stoll (2006), this is especially the case with digital information and communication technologies changing so swiftly, which means that equipment and programs rapidly become out-dated. Connectivity and its related costs are still vital issues, especially in rural areas.
    - Telecentre sustainability cannot be achieved without networking between telecentres. Telecentres need to organise themselves in overlapping national, regional and international networks for the following reasons: It allows telecentres to share insight and experience; it allows them to share resources and to get access to resources; and these networks need to engage actively in public policy debates (Colle, 2006; Fundacion Chasquinet, 2006; Stoll, 2006).
- **Financial sustainability**:
    - Collaborative efforts of the government, private sector and local communities can help telecentres to utilize solutions for building its technology (infrastructure) and content (infostructure). The public sector plays a significant role in supporting and establishing telecentres by providing physical infrastructure, financial support to local entrepreneurs and to subsidise rural service providers (Rao 2008). Lekoko (2010:62-63) agrees with the financial assistance and urges that “without proper state or government intervention (Attwood *et al.*, 2013), the rural developing communities may not be able to acquire and benefit from the information and

communication technologies". Naik *et al.* (2012) have also found in India that collaborative efforts from government services from various departments of State government and local government bodies could enable the telecentre to be financial sustainable. Means to stimulating demand for services among the local community should argue this demand should be reflected in the community's willingness to pay for services (Naik *et al.* 2012).

- Telecentre sustainability cannot be achieved on the basis of providing and selling technology services alone (Fundacion Chasquinet, 2006).
- Stoll (2006) argues that telecentre sustainability can be achieved if the provision of technology services is seen as the 'tool' that complements the overall goal to achieve positive community development.
- Community telecentres are community 'commons' with the element of technology support (Fundacion Chasquinet, 2006; Stoll (2006).

The community and its needs (Harris, 2003, Fundacion Chasquinet, 2006) and assets stand at the centre of a community telecentre, not the information and communication technologies. This assumption supports the view that the failure of any single telecentre service (for instance the Internet) does not result in the telecentre itself becoming 'unsustainable' (Stoll, 2006). It should simply mean that one or more services are no longer available. The value of a service is also usually short term (meaning new services can be added as community needs are continually identified) and can be discarded as needs are met. From the above it is evident that researchers (Harris, 2003; Colle, 2006; Fundacion Chasquinet, 2006; Stoll, 2006; McConnel, 2007) came to the conclusion that the sustainability of a telecentre depends on a variety of factors as described above.

Harris (2003) agrees that the sustainability of a telecentre depends on several factors and notes that these factors have their own evolving undercurrents and dynamic forces with establishment of a telecentre. This means that the telecentres do not need to operate with the latest information and communication technologies, but that telecentres should, with the purchase of its information and communication technologies, take the following aspects into consideration: Although the needs of men and women, youths and adults may differ, the telecentre must address the needs of all peoples of the community by means of its overall goal, namely to ensure appropriate and suitable communication; although equipment and programs might become out-dated, conditions should be created that allow community telecentre approaches to develop; the role of government should not be to impose a telecentre on a community, but rather to support the telecentre so that the provision of information and communication technologies is available; information and communication

technologies is seen as the "tool" that complements the overall goal to achieve positive community development and could not reach sustainability on the basis of providing and selling technology services alone, but is reflected in the community's willingness to pay for services. It could be derived then that the factors such as social, political, cultural and technical sustainability should be merged in the various phases of the establishment as well as in its future operation (Fundacion Chasquinet, 2006).

By discussing the various forms of sustainability of a telecentre, the next Sub-section discloses the factors to be taken into consideration for the establishment of a sustainable telecentre.

3.6.1 Factors to be taken into account when establishing a sustainable telecentre

To attain long-term sustainability, researchers have established that there are several considerations to be factored where a sustainable telecentre is to be established (Dagaron, 2001:90; Benjamin *et al.*, 2000:8-16; Roman, 2000; Anderson *et al.*, 2006:2; Stoll, 2006). The following factors emerged from the literature review:

a) Participation of the beneficiaries in the project: It could be asserted that community participation forms the basis for development (Crowder, 1991; Colle, 2006; Buddenhagen & Baldwin, 2011). Lekoko (2010:58-59) supports this view on community participation (Crowder, 1991; Colle, 2006, Buddenhagen & Baldwin, 2011) and mentions that in order to bring information and communication technologies closer to the community's ideals and needs, "communities themselves, under their traditional leaders, should take a leading role in this development". The issue of community participation is a key concept if telecentres are to play a part in development and social change says Lekoko (2010). This means that the participation of beneficiaries is not something that can be incorporated after a telecentre has already been established, but it should be a pre-condition for the establishment of a telecentre.

The participation of the community in the implementation of a telecentre should be of such a nature that they take ownership of the telecentre, including its use, maintenance and management (Gillman, 2006). By means of a participating community (Gillman, 2006) the improvement of the community utilisation of the information and communication technologies is an important step and not understanding the benefits that could be gained, may lead to a lack of enthusiasm for the uptake of the information and communication technologies (Gumucio-Dagron, 2001). As is the case with any development project that originates from external agencies, sustainability can only be assured through the commitment and

participation of the community of beneficiaries (Shanmugavelan, 2000; Anderson *et al.*, 2006; Stoll, 2006). This is not directly related to the issue of funding. Many development projects have failed in spite of having external support over many years, because the community never developed a sense of ownership of the project or programme, and remained alienated from it. The community should participate in the project to establish a telecentre from the start – because the community will be the beneficiaries (Ernberg, 1999; Anderson *et al.,* 2006; Roman & Colle, 2006). Rao (2008:481) adds that it is an established fact that a telecentre's sustainability will be determined by the "degree of acceptance by the community that it serves". A successful telecentre will have a major effect on the community – stimulating and motivation its culture, communication patterns, economy, social structure and future development. For greater impact, telecentres should be perceived as providers of information and communication technologies rather than social and cultural community centres. A success factor lies also in the extent of community involvement in, and commitment to, a telecentre and thus plays the measuring of user behaviour and perceptions a pivotal role in the evaluation of telecentres.

b) Demand: When selecting locations for telecentres, the level of potential demand for communication and information services from a large number and a wide range of users should be taken into account (Roman, 2000). Technology cannot function successfully in the absence of some form of community ambition for a better life and Colle and Roman (1999) are of the opinion that aspirations often need to be ignited, sometimes by an outside influence, and they need to be kindled and rekindled over time – for example learners who need the information and communication technologies for producing assignments, etc., or from inside, such as those who have to manage an institution (Saraei & Amini, 2012). This will ensure utilisation of an institution such as a telecentre and reduce the expense to individuals through sharing of costs, i.e., economies of scale (Benjamin *et al.,* 2000). In other words, appropriate information and communication technologies to address the communities' information needs should be available and the information needed must be accessed and created by means of these information and communication technologies (Choi, 2009).

c) Location: Naik *et al.* (2012) are of the opinion that distance and convenience play an important role, as rural people are currently required to travel long distances to avail certain services such as tuition and English language coaching. Naik *et al.* (2012) furthermore propose that the provision of the telecentre services would not only reduce costs for the rural people, but would also be more convenient since the

telecentre provides the services closer to home. Another aspect in the location of the telecentre is that the proximity of the telecentre to other organisations and institutions that could be involved in using, supporting, maintaining or operating the telecentre should be investigated (Anderson *et al.*, 2006). Agreeing on the aspect of locality (Naik *et al.,* 2012) the telecentre should be near organisations and institutions that include "hospitals or health centres, schools/colleges/universities, community and cultural centres, religious centres, libraries, organisations of farmers/fishermen/craftsmen, post offices, local/national government administration offices, radio and television stations, NGOs and community-based organisations, etc." urges Shanmugavelan (2000) as well as Ernberg (2006). Even if the initial installation of the technology in a telecentre is done according to specifications, continuous support will be needed for the maintenance of devices and assistance with troubleshooting and training (Benjamin *et al.*, 2000). Regarding the issue of support, Conradie (1998) warns that if affordable support services are absent, it becomes very difficult to sustain any telecentre. That is why it is also recommended that telecentres "involve other organisations and institutions that can play a supporting role" (Conradie, 1998:106).

d) Training programme: For a telecentre to be sustainable, a programme of continuous training and capacity building for the personnel and users should be developed and followed (Colle, 2006). If this is not done, the quality of the service delivered by the management of the telecentre will deteriorate, while the community will develop a fear of the telecentre, because they may not know what to ask for and how to utilise it – especially new users (Conradie, 1998; Benjamin *et al.,* 2000). Martin and Rader (2003) agree on the matter of training and remark that means such as coordinated training and support in the use of information and communication technologies will result in optimal use towards a developed community. Roman and Colle (2006) caution that the telecentre personnel may also need to train personnel (Everett & Shukla, 2001; Ekeanyanwu & Okeke, 2010) in other related organisations such as agricultural co-operatives, etc. to strengthen the realisation that the telecentre can support other organisations and their members with relevant information resources.

From the above aspects regarding the establishment of a sustainable telecentre it could be concluded that important factors in the establishment of a sustainable telecentre are that the community should be involved from the start and allowance be made for their indigenous culture and needs (Crowder, 1991; Colle, 2006; Buddenhagen & Baldwin, 2011). It is especially important that the beneficiaries participate and be involved from the inception of

the project. They will then operate and treat the telecentre and the technologies as their own and appreciate it by using it cautiously, with respect and regularly update it. The demand for the technologies should exist, or else it will result in the telecentre being unutilised with unnecessary expenses.

This Sub-section explained the various factors to be taken into account for a sustainable telecentre. In the next Sub-section the potential of such a sustainable telecentre in championing development will be looked into.

3.6.2 The potential of telecentres in assisting development

The potential of telecentres in solving problems of sustainable development has been described and explained by several authors (Bibby, 2001; Elmer, 2001; Benjamin & Dahms 2004; Heeks, 2004; Saraei & Amini, 2012). These positive ideas regarding telecentres are also voiced: "Telecentres have matured and … today we hear of success story after success story as individual telecentres identify new programmes and monies of their own" (Bibby, 2001:6).

There is general consensus that telecentres have considerable potential for narrowing the digital divide in remote, rural and disadvantaged communities since they provide access to the Internet (Delgadillo & Borja, 2001; Goméz *et al.,* 2001; Benjamin & Dahms, 2004; Latchem & Walker, 2006) as well as facilities to communicate with the outside world via the telephone, mobile phone, e-mail and multifunctional printers (Benjamin and Dahms, 2004; Heeks, 2004; Painting, 2004). Rao (2008:477) cautions that the success of functionality depends on "reliable hardware, software, connectivity and economic incentive from the government". Regarding the hardware (Rao, 2008), Saraei and Amini (2012) agree and urge that telecentres should offer the latest and locally custom-made technologies and that they must provide information in the indigenous languages of the community. In addressing these aspects, the telecentre supports and promotes the use of locally relevant content in order to improve and enhance sustainable development.

Telecentres can, therefore, be a developmental instrument that helps to close social, economic and knowledge gaps which are a result of the digital divide that separates the information rich from the information poor (Goméz *et al.,* 2001) by providing access to e-education, e-governance, e-healthcare and other e-services, and assisting the developing community to develop socially and economically (Latchem & Walker, 2006). Naik (2011) adds that sufficient services in a small-size population area can come only through providing integrated services at an affordable cost and lists services such as public and private services such as e-education, e-health, e-agriculture, e-employment and financial inclusion which address the needs of the peoples, the government as well as business.

In this Section it was proclaimed that telecentres have the potential to assist development by narrowing the digital divide. It is now necessary to describe how telecentres support developing rural communities. Under Definition of Terms in Chapter 1 in Section 1.5, it was explained that the farmers at these schemes are mostly poor, illiterate and in the developing phase. Therefore the following discussion will be regarding developing communities, with the infrastructure as well as the infostructure to address the need for development. This evaluation is extracted from the literature applying the same criteria for the successful establishment of a telecentre that was elaborated on in Chapter 2.

3.6.2.1 Infrastructure

While many nations seek to expand information access to rural areas and urban slums, private telephone, fax, e-mail and Internet links are unaffordable for most people in the developing world. It is therefore important to note that infrastructure provided by a telecentre could vary from the phone (phone-shop) (Jensen & Esterhuysen, 2001; IDRC, 2007b) to Internet connectivity (Ernberg, 1999). Telecentres provide shared access to the communications infrastructure and thus the possibility for many to share the cost of a single connection (Development Gateway, 2006b). The problem, though, regarding the infrastructure is voiced by Shearman (2003:23) that "at the local level at least, some of the funding resources (are) being directed away from equipment and centre provision toward supporting development of citywide community networking". Naik (2011) agrees with the view regarding funding and advises that the choice of appropriate technology for rural telecentres is an important decision to make as it also has an implication on the structure of the telecentre as such. Shearman (2003) warns though, that the development of cost-effective mobile technology suitable to rural areas with required extensive applications will be available only in the long run, as illiterate rural people need assistance with several services which can be provided effectively through telecentres.

In developing countries, the telecommunications infrastructure is concentrated in the larger cities (Painting, 2004; Statistics South Africa, 2006) and in many countries it is virtually non-existent in rural and remote areas. In Sub-Saharan Africa "50 percent of the fixed line telephones are concentrated in the capital cities where only 10 percent of the population live; public telephones serve urban areas with a paltry of 75 000 public telephones for the whole of Sub-Saharan Africa" (Painting, 2004:8) and in December 2008, there were an estimated 34.1 million cell phone users in South Africa (South Africa, 2009). It could be derived then that the establishment of telecentres in agricultural areas *ipso facto* provides infrastructure like telephones, mobile phones, computers, copiers, printers, faxes, etc. that provide the opportunity for exposure to information that can lead to knowledge and development, provided that legislation and costs are reasonable.

There is also the issue of the telecentres in India, says Thomas (2009:28) for access to the needs of small farmers who often spend a day or more "travelling to a sub-district office to collect their land records", agreeing with theorists such as i4d (2006b), Roman (2000) and Anderson *et al.* (2006) on distances in remote areas and travelling costs. This issue involves finances (Gumucio-Dagron, 2011) and although there is definitely a need for more telecentres as infrastructure with multi-functions. It would seem that a stand-alone telecentre that would be only capable of supplying land records is a huge waste of a technology that can be used to provide a range of services, from telephony to e-commerce and extensive information related to e-governance. This indicates a larger issue – the fact that information and communication technology projects are capital intensive, a major issue for extensive computerisation projects in the developing world.

The infrastucture that the telecentre brings to the community it serves, is the information and communication technologies that could enable communication (Feuerstein, 1986; Conradie, 1998; Development Gateway, 2006; McCarthy, 2006a; Saraei & Amini 2012) – one of the pillars (Denison & Monana, 2007) that leads a community to development (Parker & Hudson, 1995; Jimba, 2003; Ekeanyanwu & Okeke, 2010; Yanggratoke *et al.,* 2011). This is in spite of many questions which were raised regarding telecentre access (Thomas, 2009:28), location (Painting, 2004; Statistics South Africa, 2006) and finances (Gumucio-Dagron, 2011).

This Sub-section presented a discussion regarding the infrastructure that could be offered by a telecentre in order to link the developing to the information super-highway by means of communication that could enhance the development of a community. The next Sub-section will explore the infostructure offered by the telecentre – the information to be obtained, assessed, managed and disseminated in order to support the development of a developing community.

3.6.2.2 Infostructure

Once the infrastructure is established via a telecentre, access to information is provided via these technologies for sharing local, regional and global information. Developing countries can use the Internet (if affordable) to help gain access to resources and global information (Schech, 2002). Martin and Rader (2003) caution though, that information literacy is only made possible by making an effort to understand and comprehend the messages received from the information and communication technologies (Feuerstein, 1986; McCarthy, 2006) by means of obtaining information supporting the information needs of the community, together with an awareness of the importance of the ethical use of the information in the community. It must be understood then that the offering of applicable, developmental

information by a telecentre is dependent on the means of communication (Feuerstein, 1986; Conradie, 1998; Development Gateway, 2006b; McCarthy, 2006; Saraei & Amini 2012) that enhances development (Castells, 1998; Van Audenhove, 2001; Gomez and Ospina, 2002; Gurstein, 2003; Tarjanne 2003; James, 2010; Udoudo, 2010; Colle, 2011c) as well as support for all informational efforts, including offering language-specific software, continued investments in hardware and software, and capacity building and networking. On the topic of infostructure, it is also important to be reminded about the WSIS which has confirmed several action lines in collaboration with UNESCO, as explained in the previous chapter (WSIS Forum, 2011). One of the most important action lines in this regard is the action line on cultural diversity and identity, linguistic diversity and local content which aims at (C8): "Cultural diversity; cultural exchange and information; cultural heritage; cultural industry; cultural policy; digital archive; disadvantaged and vulnerable groups; indigenous peoples; internationalized domain names; language-related ICT tools; linguistic diversity; local languages; and traditional knowledge" (WSIS Forum, 2011:88).

Thomas (2009) from India points out that access to developmental information and collective validations of information in public hearings played an extraordinarily important role in lessening the exercise of power by local development bureaucracy and breaking the apathy of a people who were used to being the powerless, passive victims of development. Thomas (2009) advocates that information became a weapon, used to leverage development in which the stake holders played a key role in ensuring that its benefits were equitably distributed: While a variety of forewarnings and obstructive barriers, inclusive of costs, departmental delays, exceptions, and limits to disclosure can be considered serious limitations, the very fact that the State has validated the role and value of information in development has stimulated hope of a substantive democracy in India.

Additionally, access to the Internet via telecentres, can serve the community as an e-educational resource as well as a site for professional development with ethical and moral information (Saraei & Amini, 2012). Providing access to the Internet could assist developing countries to equalise their exposure to information, taking into consideration the type of information that is needed for the development – for instance the agricultural sector – such as financial institutions, traders, researchers and extension workers (Nageswara, 2006).

Two web-sites, based in South Africa, have specifically succeeded in addressing the need for agriculture-related information in the southern African context. The web-sites of the Agricultural Research Council (ARC) and of AGIS respectively provide information on farming practices, irrigation, mechanisation, renewable energy, farm structures, etc. for South African circumstances. In other words, through the infostructure, information and

communication technologies have the potential to bring information for development to rural areas (ARC, 2012).

These two Sub-sections explained the potential role of telecentres in assisting development, with reference to the telecentre providing the infrastructure as well as the infostructure. If a telecentre wants to support the socio-economic development of the community, it is important that the telecentre, especially in the rural areas overcome some barriers. These barriers will now be discussed.

3.6.3 Barriers that hamper access to tele-services in rural areas

Telecentres have the potential to overcome the five main barriers that currently hamper access to tele-services in rural areas, namely "the network barrier, the service barrier, the cost barrier and the qualification barrier" (Qvortrup, 2001:2) and "technophobia" (Gillman, 2006; Roman and Colle, 2006):

- In many parts of the world, and particularly poor countries or rural areas, there is a lack of access to telecommunication networks for plain telephony, not to mention more advanced tele-services. This is the *network barrier*. In many African countries, rural communities cannot access technologies as others can, because there is no electricity and some infrastructure is needed to support the use of new information and communication technologies where they live in rural areas (Ekeanyanwu, 2010). The question now is whether a telecentre in a rural area can afford the information and communication technologies – especially the newer technologies such as Internet facilities (Ruiz-Mercader *et al.*, 2010). But before that is possible, a telephone connection is necessary. Many rural areas in South Africa do not even have telephone lines, to say the least about telephone connectivity (Qvortrup, 2001).
- Secondly, there is the *service barrier*. The service barrier is associated with the continuous flow of information that communities find useful and useable in order to support and address the community needs (Buddenhagen & Baldwin, 2011) where the telecentre proactively must locate new sources of useful information in order to alert the community to the value of information (Rao, 2008). Sometimes the services provided by the telephone connection are limited. Tele-services are very often not related to the needs of rural communities, but based on the demands of the urban population. The telecentre in the agricultural sector of the developing world will have its own needs, problems and demands based on the needs of the farmers (Raslan, 2006; Colle, 2011b; Tengtrakul & Peha, 2011) – the socio-economic needs as well as the information agriculture-related needs and the ICT needs.

- Thirdly, there is the *cost barrier.* For a rural community, a small farm or a small, family-based enterprise, computers, including software, technical support, continuous upgrading, etc. are still quite costly. For a person from the developed world a computer with Internet connectivity might sound quite affordable, but for the small-scale farmer in the agricultural sector of a developing country, this would be costly (Ruiz-Mercader, *et al.*, 2010). Particularly because the agricultural sector faces the dilemma of competition for scarce resources (Kirsten & Van Zyl, 1998; Perret *et al.*, 2003). Especially financial resources, due to the termination of funding after the once-off grant that most telecentres receive for their establishment (Kiplang'at, 2004; Painting, 2004; Fuchs, 2006; Colle, 2011b). The income of the telecentre is generated amongst others through the daily use of the information and communication technologies by the users of the surrounding community.
- There is the *qualification barrier.* Skills which are not always attained by people in the rural areas are required to use computer programs and advanced information and tele-services. Martin and Rader (2003) agree with several theorists on the ability to operate the information and communication technologies (Castells, 1985; Benjamin & Dahms, 2004; Painting, 2004) and suggest that the manager of the telecentre should consider skills training in information and communication technologies with the same conceptual tools as we apply to other technologies – how people are able to use them in different and diverse ways. The telecentre could make a difference, as training – of at least the manager or the secretary – in the use of the information and communication technologies is one of the basic aspects of a telecentre. Rao (2008) cautions that projects that introduce new skills, such as the training of the manager, need to utilise and sustain the created capabilities of the trained people, or their trained replacements, to the extent that they continue to work in the same area, since trained staff often discover a better market for their skills and are lured away from the project.
- The general attitude towards new information and communication technologies is quite often very reluctant and Fuchs (2000) warns that while technology can be a significant driver of community development, it can also be a major barrier because of people's mistrust and fear, which is called *technophobia.* Technophobia is the fear or dislike of advanced technology or complex devices, especially computers and the reluctance to use it or to accept the information that it provides (Gillman, 2006; Roman and Colle, 2006). Bailey and Ngwenyama (2011) authenticate this view on technophobia and add that it is especially older, technology-challenged persons that require more assistance and support in making use of online services, and it is

important to address this need. Rural telecentres can provide a supportive environment by providing support and training or through the help of the managers (Sein & Furuholt, 2009; Bailey & Ngwenyama, 2011). This is common among the illiterate farmers as well as other members of the developing community. It is important to note that, as explained in the previous point, it is necessary to train the manager, in order for him/her to explain the operation of the information and communication technologies to the farmers, which would lead to the information and communication technologies being transparent in order for the users to focus on the use rather than the operation of these information and communication technologies (Marshall *et al.,* 2003). If the farmers are comfortable with the secretary, they will also accept the information and communication technologies as well as the information provided by these information and communication technologies.

Only when these barriers, discussed in this Sub-section have been overcome, a telecentre can be optimally utilised, which leads to the discussion of the main purposes of the agricultural telecentres in the next Section.

3.7 MAIN PURPOSES OF AGRICULTURAL TELECENTRES

Whether the rural-agricultural telecentre is located in a developing country or in a rural area of a developed country, these telecentres work as agents offering a wide range of facilities like information and communication technologies providing services such as the telephone, e-mail or the Internet connectivity (infrastructure) (Parker & Hudson, 1995; Jimba, 2003; Khumalo, 2006; Ekeanyanwu & Okeke, 2010; Yanggratoke *et al.,* 2011). The information obtained (Feuerstein, 1986; McCarthy, 2006) from the information and communication technologies could, by means of the new knowledge obtained (Bekenstein, 2003; FAO, 2006a; McCarthy, 2006), lead to developing human capacity. This is due to the fact that the agriculture-related information needs, the socio-economic needs and the ICT needs of a developing community could be addressed by means of obtaining valuable information (infostructure) (Castells, 1998; Van Audenhove, 2001; Gomez & Ospina, 2002; Gurstein, 2003; Tarjanne 2003; Udoudo, 2010; Colle, 2011c) by the members of the community via the information and communication technologies (Van Audenhove, 2001). UNESCO (2011) explains that as community information centres, these agricultural telecentres supply access to databases, receiving and posting information to local people on matters concerning the spread of diseases, weather forecasts for the planning of crop planting and harvesting seasons, as well as information of utmost importance on looming floods and fires, and information regarding prices of farm products and farming implements. Educational opportunities exist at the telecentres where the training centres and schools are located far-away. Consequently the establishment of agricultural telecentres is also of importance in

rural areas as these telecentres offer valuable developmental services, as it is called by Benjamin (2001). The opinion of Naik *et al.* (2012) is important to note as they point out that people in rural areas involved in manual labour do not receive proper treatment for various conditions such as skin diseases, eye-related infections and disorders, due to the absence of specialists in the rural areas and the inconvenience of travelling to the nearest health centre. These problems could be addressed by establishing a telecentre which could accommodate telemedicine (Saraei & Amini, 2012). The practical, gainful and cost-effective services accessible to the rural society through these community centres had a positive impact on the socio-economic development of the rural population (Saraei & Amini, 2012).

A case study of the Indian Tobacco Company, the Agricultural Information and Communication Initiative (AICI), empirically analyses the decision-making capabilities of farmers by means of evaluating the role of information delivery through information and communication technology, offered by a telecentre. Regarding the agricultural supply chain, users of AICI show significantly better decision-making aptitudes as compared to non-users of technology (Ali & Kumar, 2011).

It is clear that each researcher and author emphasises another aspect and purpose of a telecentre. But there is no doubt that an agricultural telecentre (via information and communication technologies – the infrastructure, as well as the handling of information – the infostructure) supports socio-economic development by addressing the information needs of a developing community. The main purposes of the agricultural telecentre, as discussed by several researchers (Benjamin, 2001; Van Audenhove, 2001; Khumalo, 2006; Ali & Kumar, 2011, Saraei & Amini, 2012) could be summarised as follows:

- The establishment of **communication links** by means of information and communication technologies which form the infrastructure; and,
- The creation, acquisition and dissemination of **information**, where the packaging and the appropriateness of the information form the infostructure.

The main purposes of the agricultural telecentre were discussed in this Section. But how could these telecentres survive, and what are the challenges they are facing? In the following Section these challenges faced by the agricultural telecentre will be discussed.

3.8 CHALLENGES OF THE RURAL-AGRICULTURAL TELECENTRE

Theoretically, rural-agricultural telecentres, based on information and communication technologies some with Internet connectivity to present precise, latest, relevant content should be universally successful. Aspects such as demographics, geographics, culture, social, psychological, economic and other factors could give rise to negative conditions

(UNESCO, 2011) in the availability of the information and communication technologies. Challenges faced by telecentres include addressing the precise local needs of the community, situated in a diversity of local conditions articulate Thamizoli and Balasubramanian (2002). Thamizoli and Balasubramanian (2002) and Fuchs (2006) explain that these challenges faced by an agricultural telecentre particularly include the low use of word-based information due to illiteracy; necessity of intermediaries due to remote locations; absence of information sources due to the diversity of regional languages and their dialect and the cost of information and communication technology. Regarding the telecentres in India, Vasanthi (2011) is of the opinion that initiatives to set up Internet kiosks in rural India failed due to kiosk operators lacking a large revenue stream as many kiosks were established with only e-Governance applications in mind. Vasanthi (2011) explains that another experience was that compared to the actual activity in the physical world, traffic at the websites were bad. Architects and website designers also impose barriers to information which affect information dissemination. In spite of the central intention of value and the overwhelming investing in and financing by the Indian government, many NGOs and other agencies that develop portals connected with agriculture, have failed due to limited Internet interchange on these websites (Vasanthi, 2011).

There are many challenges for telecentres to overcome in order to attract clients and become sustainable through the optimal usage of the information and communication technologies (Moemeka, 2007). The views of Moemeka (2007) and Bailey and Ngwenyama (2011) are important to note as they remark that there is growing acknowledgment that if we are to achieve universal access in the agricultural sector, more research is needed to understand the needs of older persons and members of excluded groups for support in understanding and optimal usage of the information and communication technologies (Moemeka, 2007; Bailey & Ngwenyama, 2011). Therefore research is needed on a range of issues such as attitudes, e-literacy, user experience, interface design, and social support in the use of information and communication technologies in our emerging digital cultures. James (2010) argues that the high costs of and lack of skills in operating the technology leads to difficulty in bringing the Internet to rural areas of developing countries. On a more positive note James (2010) remarks that a number of promising alternatives are beginning to emerge such as persons who do not actually come into direct contact with the technology but represent the rural population in the developing countries. James (2010) proposes two possibilities: The first is blending (with an intermediation at a distance) and the second is telecentres (at close range). Bailey and Ngwenyama (2011) agree with theorists (Moemeka, 2007; James, 2010) on the various challenges and propose that some of these challenges could be addressed by means of knowledge and information sharing, social interaction,

collaboration, and e-government or business-related telecentre use by the local community. It could be noted then that research regarding the various ways of improving access to the Internet and digital city is still at its beginning, still developing and that more research regarding the application of information and communication technologies, with or without Internet connectivity, is needed.

Researchers (Heeks, 2004; Roman & Colle, 2006; Moemeka, 2007; Bailey & Ngwenyama, 2011; Saraei & Amini, 2012) have identified some challenges of the agricultural telecentre, which encompass the opinions of several authors on this subject.

The most important of these challenges will now be categorised and discussed.

- **To enable communication for development**

Not everyone spontaneously understands the value of information (Roman & Colle, 2006) and therefore one of the biggest challenges that agricultural telecentres face, is to provide relevant information to their users (Castells, 1998; Lekoko, 2010; Colle, 2011c). In order to survive, agricultural telecentres must be demand-driven, in other words, they must address the information needs of the farmers. Gillman (2006) is of the opinion that this means that agricultural telecentres should always have relevant and useful content available. Before farmers will accept data, they must trust both the source and the medium of communication (Heeks, 2004) otherwise they will see the information as irrelevant. This trust is mainly created through the participation and involvement of members of all ages and genders in the community, advise Thamizoli and Balasubramanian (2002) and Fuchs (2006).

- **To use indigenous languages as part of the indigenous peoples' culture**

Because language forms part of culture, special attention is given to language, as it plays a major role in understanding the messages received via the information and communication technologies of an agricultural telecentre. No matter how wired a country or a community becomes, without basic literacy, the major benefits of technology will be lost (Roman & Colle, 2006). On the negative side, Cairncross (2000) cautions that with globalisation and developments in information and communication technologies, American culture and the English language could swamp their cultures and traditional industries. Opposing this view is Ekeanyanwu (2010) who is of the opinion that the flow of information from the global North to the global South results in an intermingling of cultures, rather than the dominance of one culture over another. Ekeanyanwu (2010) explains that the concerns regarding the foreign entertainment of the American television and film took a secondary place among a global domestic audience, especially when language differences require the programmes to be either dubbed or subtitled. It is therefore important that agricultural telecentres should take the indigenous language of the farmers into consideration (Gillman, 2006). Saraei and Amini

(2012) agree on the subject of the indigenous language and advise that the information provided at an agricultural telecentre will be of limited significance if the messages are in an unfamiliar or inappropriate language or dialect. The failure to take cognisance of this caveat can impair the farmers' understanding (Roman & Colle, 2006). Important to note is the observation of Fuchs (2006) that if the message is not in the indigenous language, it is most likely that it will not be understood by the farmers, especially if they live in remote areas where only their own indigenous language is spoken (Fuchs, 2006). The result is that, as users in remote areas will not understand the language of the information and communication technologies, it will be the task of the manager of the telecentre to convert the messages into the language of the users. Messages should be adapted to appropriate cultural context to be able to achieve effectiveness in intercultural communication (Ekeanyanwu, 2010). Moemeka (2007) stresses this importance of information intermediaries especially for the older generation being mostly illiterate farmers, as explained by Thamizoli and Balasubramanian (2002) and Fuchs (2006) above. These intermediaries should understand both the language employed and deployed by the information and communication technologies as well as the local, indigenous language, in order for them to translate the messages from the information and communication technologies into the language for the local farmers to understand. Without this intermediation, the information and communication technologies will be of little use to the local people.

- **Respect for the cultural context**

Rural communities have their own culture which should be taken into consideration when information and communication technologies are introduced. This means that those who create the content that is disseminated via the telecentre should understand the context of the receivers, otherwise problems of miscommunication and misunderstanding can arise (Heeks, 2004). Ekeanyanwu (2010) agrees on the subject of cultural context and notes that the encoder constructs messages that accept the worldview or culture of the decoder in the communication process – it therefore involves thinking and acting without consideration to ones cultural context thus interacting in the sovereignty of the other person's culture. For the illiterate, knowledge that helps us to apply information is limited to its local context (Saraei & Amini, 2012). This means that producers of content should take the local context into consideration when producing content for the rural people.

Development is unthinkable without a framework of culture. The customs, values, needs and traditions of the people to be developed should be taken into consideration in the development process (Jayaweera & Amunugama, 1989; Fuchs, 2006). Lowry (1995:11), referring to the agricultural sector, reminds that it could also be said that "if we put the culture back into agriculture, perhaps the rural poor will get the chance to be the authors of their

own development". It is promising that "modern technical education should result in student researchers seeing farmer's indigenous knowledge as a challenge" (Heeks, 1995:141; Moemeka, 2007; Assefa *et al.,* 2010), which may be called cultural flexibility and compliance of the researcher to the farmer's cultural worldview (Ekeanyanwu, 2010). The indigenous culture of farmers is an aspect that will have to be thoroughly researched by those involved in the development of farmers and addressed when implementing telecentres. This requirement applies to all developing sectors, not only the farming sector.

This Section discussed the challenges faced by the agricultural telecentre in its aim to provide relevant information that could lead to addressing the socio-economic, agricultural information needs and ICT needs of farmers. In the next Section, the chapter will be summarised, conclusions will be drawn and lessons learnt will be discussed.

3.9 SUMMARY, CONCLUSIONS DRAWN AND LESSONS LEARNT

Chapter 3 was an extension of Chapter 2, in the literature study of this study: In Chapter 2 information and communication technologies and how they can bridge the digital divide was discussed. This discussion led to this Chapter discussing the telecentre, based on this information and communication technologies: Section 3.2 explained the ethnographic paradigm, from which the participatory approach is concluded. Section 3.3 described the concept of a telecentre and how information obtained from the information and communication technologies offered by a telecentre could lead to development with Section 3.3.1 on the functions of telecentres in order to reach the aim of telecentres, Section 3.3.2. on the importance of a participatory needs assessment to identify local needs and Section 3.3.3 on how to become a productive receiver and manager of applicable information for development. Section 3.3.4 deliberated on the functions of the telecentre in a multi-cultural society. Section 3.4 dealt with information extended to the agricultural telecentre in the developing world, with Section 3.4.1 on conveying appropriate information for development to the agricultural telecentre and Section 3.4.2 on the compilation and packaging of information for the agricultural telecentre. Section 3.5 discussed the agricultural telecentre and development with Section 3.5.1 on challenges facing the agricultural telecentre, Section 3.5.2 on the advantages of the agricultural telecentre, and Section 3.5.3 on taking the indigenous culture into consideration. Section 3.6 debated the actual establishment of a sustainable telecentre with Section 3.6.1 on factors to be taken into account when establishing a sustainable telecentre, Section 3.6.2 on the potential of telecentres in assisting development with a sub-section discussing infrastructure and infostructure. Section 3.7 explained the main purposes of agricultural telecentres, followed by Section 3.8 regarding the challenges of the agricultural telecentre. The chapter concluded with a summary, conclusions drawn and lessons learnt in Section 3.9

Special reference was given to the pivotal role of the agricultural telecentre where crucial information could be obtained (Feuerstein, 1986; McCarthy, 2006) via the information and communication technologies regarding farming methods, crop challenges, access to land records to purchasing farming products. More specifically referring to South Africa, it is important to note that the information and communication technologies could assist and support the farmer at the WUA, as explained by Van der Merwe (2007) to effortlessly and precisely calculate and submit the various forms of information requested by the DWA. It is also important to note that the South African telecentres operate under harsh environmental conditions which might lead to financial difficulty, but that various researchers explain that the sustainability of a telecentre depends on diverse factors, and not financial implications alone. The main purposes of the agricultural telecentre were summarised as the establishment of communication links and the creation, acquisition and dissemination of information crucial to addressing the agriculture-related needs as well as the socio-economic development of the farmer, and were followed by a discussion on the challenges faced by an agricultural telecentre.

Perhaps the most important conclusion drawn is that this Chapter noted that a development project should be executed in a participatory manner. This participatory approach is concluded from the Ethnographic Paradigm, which was briefly explained, taking the culture into consideration with the establishment of a telecentre – the value of using indigenous values, beliefs and principles of the rural communities to be developed (Heeks, 2004; Igben, 2010). As part of indigenous culture, Jayaweera and Amunugama (1989), Fuchs (2006) and Lekoko (2010:60) found that the “customs, values, needs and traditions” of the people to be developed should be taken into consideration in the development process. This led to the conclusion that the ideas, suggestions, needs and values of the farmers, as research participants, should play a pivotal role in the development process and this consequently leads to the fact that the establishment process of the telecentre should therefore be *participatory* (Mikkelsen, 1995; Berg, 1998; De Vos *et al.*, 2001; Coryn, 2011). This important aspect and feature of a *participatory* process should not only be considered in the design of a process to establish a sustainable agricultural telecentre, but should also be taken into consideration with the evaluation of the process for the establishment of the telecentre. It is therefore important to note, as part of the participatory process, the barriers and the challenges faced by the researcher in the endeavour to establish a sustainable telecentre in a rural agricultural context:

One of the most important *barriers* to take into consideration with the establishment of a sustainable agricultural telecentre is regarding finances, as the telecentre mostly receives only a once-off grant with the establishment (Gumucio-Dagron, 2001). Theorists (Qvortrup,

2001; Ruiz-Mercader *et al.*, 2010) also relate to the involvement of the research participants and include that there are the lack of access to *telecommunication networks* for the farmers in the rural areas; the *service barrier* (Buddenhagen & Baldwin, 2011; Rao, 2008) regarding the flow of useful information to the farmers; the *cost barrier* due to scarce financial resources for not only the establishment of telecentres, but more regarding the administering, running and operating of the telecentre (Kiplang'at, 2004; Painting, 2004; Fuchs, 2006; Colle, 2011b) available to the farmers; the *qualification barrier* where the users should be trained and skilled in the operation of the information and communication technologies with the challenge that many rural farmers are illiterate (Castells, 1985; Benjamin & Dahms, 2004; Martin & Rader, 2003; Painting, 2004); and *Technophobia* which is the fear by the unskilled farmers for the usage of computers and the reluctance to use it or to accept the information that it provides (Gillman, 2006; Roman and Colle, 2006; Bailey and Ngwenyama, 2011), which might be found among farmers.

Challenges that could be faced with the establishment of a sustainable agricultural telecentre, are related to the *participatory* establishment and evaluation process and include that: *Relevant information* (Castells, 1998; Fuchs, 2006; Gillman, 2006; Lekoko, 2010; Colle, 2011a) should be made available and disseminated to the users; *indigenous language should be taken into consideration* in order for the rural farmers to be able to understand the messages obtained from the information and communication technologies (Cairncross, 2000; Ekeanyanwu, 2010; Saraei & Amini, 2012) which means that the information provided at an agricultural telecentre will be of limited significance if it is in an unfamiliar or inappropriate language or dialect, which will have a negative effect of the participatory process; *Respect for cultural context* (Jayaweera & Amunugama, 1989; Lowry, 1995; Fuchs, 2006). Heeks (1995:141) and Moemeka (2007) even add that it is promising that "modern technical education should result in student researchers seeing farmer's indigenous knowledge as a challenge", supported by Assefa *et al.* (2010) who sees this incorporation of indigenous language in communication with farmers as a necessary step in reaching the optimal development of rural communities.

This Chapter explored the impact of the telecentre as a means to support and accomplish the development of communities. The Chapter made special reference to the rural-agricultural telecentre where most of the peoples speak and understand only their indigenous language. The challenges of bringing and disseminating information for development to be understood by these peoples are explained. The next Chapter will explore the various processes, procedures and techniques from literature in order to construct a methodology of a participatory process for the establishment and evaluation of a

sustainable rural-agricultural telecentre, by applying the Participatory and Monitoring Evaluation (PM&E) the participatory process.

CHAPTER 4 – RESEARCH METHODOLOGY AND DESIGN

> *"No shift in the way we think or act can be more critical than this: We must put people at the centre of everything we do"*
>
> *Kofi Annan, Millennium Report*

4.1 INTRODUCTION

In Chapter 3 it was concluded that the farmers as research participants should play a pivotal role in their own development and with the establishment of a telecentre in their community by taking cultural aspects into consideration, which include language, comprehension, perceptions, fears and aspirations. This means that their development process and hence the establishment of the telecentre and research process should be participatory, as concluded from the participatory approach, explained in Chapter 3. This Chapter will not only explore the research process – the evaluation of the establishment of a rural, agricultural telecentre but will also describe and explore the Research Methodology – the Participatory Monitoring and Evaluation Method (PM&E) method. This PM&E method will be identified as the ultimate research method after exploring participatory evaluation methods, since it was identified in Chapter 3 that the most suitable evaluation method for a participatory study of this kind is the participatory process.

This PM&E will be applied to each Phase of the generic four-phase participatory process to be created in this Chapter and according to which an intervention (Crosby *et al.*, 2000) (Chapter 1) such as a telecentre could be established and then also be evaluated by this study. The PM&E will thus form part of each project Phase of the four-phase participatory process, where each Action of every Phase will be evaluated according to PM&E, as will be applied and described in the following Chapters 5 (Phase 1), 6 (Phase 2) and 7 (Phase 3) which will evaluate the practical establishment, with Chapter 8 (Phase 4) the evaluating Phase as such.

This Chapter will consequently gather and identify methods and theories for creating a framework according to Phases as well as the identification of Actions to be undertaken during these Phases of this framework for the establishment as well as evaluation of not only a telecentre, but also other participatory interventions such as a Trust, a Cooperative or a Community Development Programme.

This chapter includes a literature review of:

- Project planning and participatory methods to design and plan a project of this nature (a rural telecentre);
- A literature review of participatory research methods (project evaluation);
- The design of a generic framework for the planning, establishment and evaluation of a telecentre;
- The design of actions within the generic framework; and finally
- An explanation of how this generic framework and actions are adapted for the planning, establishment and evaluation of the telecentre.

Section I will review literature (Section 4.2.1) on project planning and design (Section 4.2.2) as well as literature on planning and design of project actions that rely on participatory processes to be followed (Section 4.2.3). The last part of Section I include a literature review of the PM&E research method (Section 4.2.4) which forms part of the processes (actions) followed during a participatory project. Data collection methods (Section 4.2.5), Sample design (Section 4.2.6) and data analysis (4.2.7) for a participatory project are then discussed as this in turn, will form part of the PM&E actions in the project phases.

Section II identifies from Section I, the project phases that would be most appropriate for the project framework of a small-scale project (Section 4.3.1). In the second part of Section II, an evaluation of the actions identified in Section I is done and the actions required for small-scale participatory project planning, design and research (evaluation), are identified (Section 4.3.2).

Section III will commence with the design of a generic project framework that includes project phases from the planning through to the post-execution phase. This Section (Section 4.4) will explain how the various theories will be incorporated into the study in order to create a framework (four participatory phases) (Section 4.4.1) as well as the various actions (Section 4.4.2) to be undertaken in these four participatory phases, resulting in a visual model for the generic four-phase participatory process in Figure 4.5. An overview of the generic Four-Phase Participatory Process is presented in Section 4.5. This is followed by an explanation on how this generic Four-Phase Participatory Process could be applied to a participatory telecentre project (Section 4.6). Section 4.7 will present a summary of the Chapter.

After explaining the purpose and strategy of this Chapter, it is now first of all necessary to explore current approaches which could be applied for creating the framework of a generic

participatory model according to which a telecentre could be established and evaluated. This will be undertaken in the next Section, Section I.

SECTION I

4.2 PROJECT PLANNING AND DESIGN FOR THE SET-UP OF A TELECENTRE

This Section will engage in the exploration and investigation of current approaches and models which could be adapted for the creation of a framework for a participatory project. The aim of this Section is to design a participatory project and in order to obtain information on project design, the researcher has explored theories and approaches regarding Project Planning. First of all a review and summary of the various methods will be presented, after which these methods will be discussed. For this study, these consecutive phases will each be called by its own name in order to incorporate the phases of these various models.

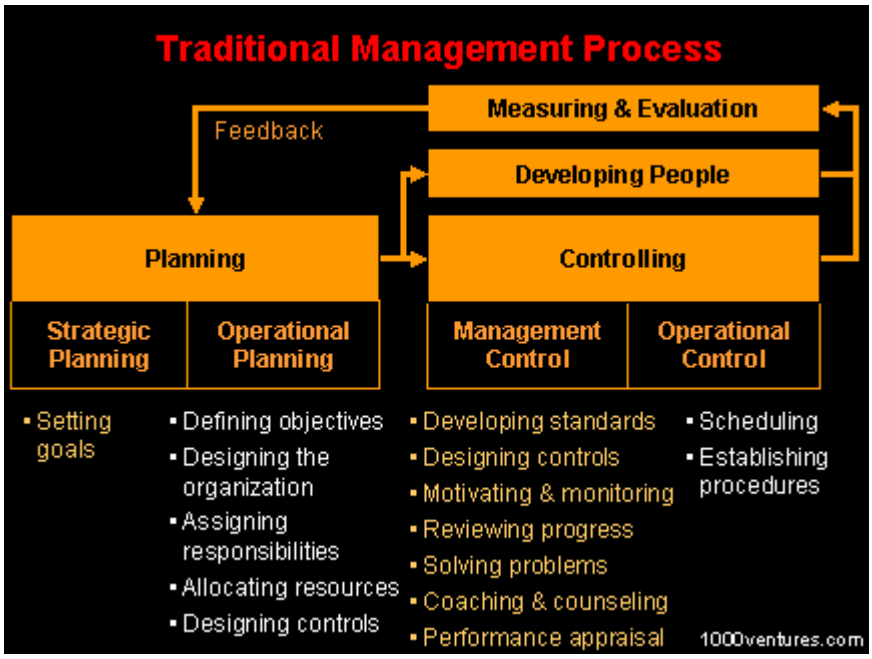
4.2.2 Methods and theories for the creation of a framework for a participatory process

The following Sub-sections were identified from several approaches and theories researched and investigated. It was found that these approaches and theories below could be applied to the creation of the four-phase participatory process.

4.2.2.1 The traditional approach

A project based on the Traditional Management Process is undertaken by means of a series of iterative phases to complete – the Planning phase, the Controlling phase, the Developing People phase and the Measuring and Evaluation phase. From the diagram it is clear the Feedback process is incorporated after the process has been measured and evaluated.

Figure 4.1 Typical development phases of a project



Source: Biafore & Stover, 2012

The Traditional Approach proposes the following iterative stages according to (Biafore & Stover) (2012):

1. "Planning": (With defining goals as the main objective, the organisation is designed; responsibilities are assigned to the various role-players; all resources are allocated. and controls are designed);
2. "Controlling" (through-out the process): (standards are developed; controls are designed; role-players are motivated and monitored; progress are reviewd with every step; problems are solved; role-players are coached and counselled; and performance are appraised);
3. "Developing People" (role-players as well as employees are motivated and enriched with new acquired knowledge regarding project processess);
4. "Monitoring and controlling systems (iterative)" (control and monitoring, as promoted by PM&E are undertaken throughout the development process by means of collaborating and participative communication).

The following aspects are regarded as important by the traditional approach, as quoted by (Biafore & Stover, 2012):

"Setting Objectives" (Biafore & Stover, 2012):

An objective is addressed in order to accomplish a goal.

"Organizing the Group" (Biafore & Stover, 2012):

The research participants or researcher as such, should have positive relations in order to include participative discussions on all activities to be undertaken.

"Motivating and Communicating" (Biafore & Stover, 2012):

Clear objectives promote motivation among role-players and aims to support role-players to reach goals.

"Measuring Performance" (Biafore & Stover, 2012):

Feedback plays a pivotal role in a project by evaluating the performance of role-players to be able to measure whether goals were successfully achieved.

"Developing People" (Biafore & Stover, 2012):

Since organisations are built on trust among the role-players, the responsibilities and the duties of the various role-players should be thoroughly formulated.

"Decentralization and Delegation" (Biafore & Stover, 2012):

Reaching a stage where group-work becomes necessary, it would be necessary to bring in extra people.

The workbook of the Traditional Approach describes the advantages and disadvantages as follows (Traditional Approach Workbook, 2015):

Suppliers approach initiators and *visa versa* when their tasks are finalised and when they give account of their projects. This important and thorough approach to development projects will always exist together with other approaches.

Advantages

- Initiators aim to finalise the project as soon as possible in order to put on record;
- Initiators have enough time in order to participate in the process;

- The protections experienced by initiators on record under the Data Protection Act and copyright act will expire earlier than data accessed recently;
- This data are made publically accessible much sooner data in the archive regarding an earlier than archives accessioned earlier in the development process. .

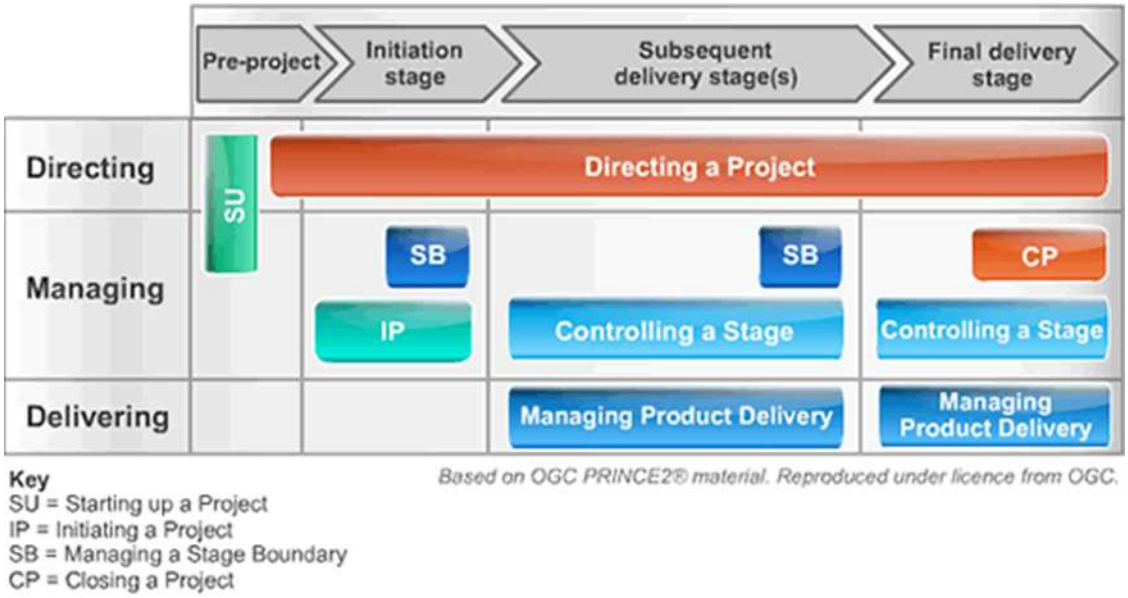
Disadvantages

- Digital records might be lost – even those records marked as to be kept indefinite;
- The process may need some outdated digital aspects, which can be undependable and expensive;
- Digital records moved from one computer to another, might loose its attributes and may no longer be authentic;
- The archive cannot be studied in its present setting.

From the various other models discussed below, it will be clear that not all of these projects models will include every stage. This is due to the fact that some projects could end before all the stages have been completed and that some projects do not follow a structured prearranged process (Biafore & Stover, 2012).

4.2.2.2 PRINCE2 Model

Figure 4.2 The PRINCE2 process model



Source: PRINCE2.COM, 2015

The Prince2 Model encourages that the project manager should be involved in the monitoring and control of all actions through-out the project, reviewing the situations, watching changes and reporting as suggested by Training Organisation (2015).

Various Phases of the PRINCE2 Model

"Starting up a project" (PRINCE2.COM, 2015)**:** All available material and data should be submitted to the project team who will discuss and identify the various resources to be incorporated. This is the first step to be undertaken, since all available material and resources should be researched before-hand, in order to decide whether the project would be sustainable and viable;

"Initiating a project" (PRINCE2.COM, 2015)**:** Once agreed to commence with the project, a dedicated and devoted team to manage the project, should be established; To establish a committed management team once agreed to proceed with the project; how the various resources agreed upon should be applied; Project Team should take ownership in order to commence with the project; important in this step is that standards and principles for decision-making should be identified – who should make decisions on which aspects, as PM&E advises that all role-players should be involved in the decision-making processes; decisions on who should be accepting risks management;

"Managing Stage Boundaries" (PRINCE2.COM, 2015)**:** To confirm Project Team regarding the deliverables of the current phase undertaken; discussing the project feasibility and approval by the end of the specific phase – iterative feedback sessions promoted by PM&E; authenticate and take record of all experiences encountered to apply to the rest of the project (iterative);

"Closing of a project" (PRINCE2.COM, 2015) **:** To measure evaluate the level of objectives reached, which is called the summative evaluation by PM&E; verify the customer's approval and agreement ;propose continuation of actions; arrange a report of the End Report for the holding company regarding termination of the project and resources. For the PRINCE2Model, the Business plan paves the way for its own inputs, outputs, goals and activities.

4.2.2.3 Agile project management

Figure 4.3 The iteration cycle in agile project management

Source: TutorialsPoint (2015)

Agile project management, with its iterative approaches, focuses on the management of interaction and collaboration of persons Agile-based methodologies are "most typically" employed in software development as well as the "website, technology, creative, and marketing industries" (TutorialsPoint, 2015). The Agile product development sees a project not as a pre-planned process, but rather as a sequence of small tasks to be adapted and executed in order to comply with demands.

Supporters of the Agile project management claim that (TutorialsPoint, 2015):

- "The whole team operates as a cohesive component – from developers through to the customer". This is in line with the PM&E method that encourages that all role-players should be simultaneously engaged in the development process;
- "This cohesiveness is made possible by means of regular communication by means of daily meetings to determine daily operations and dependencies". According to the PM&E, all role-players should be involved in the decision-making processes;
- "A provision cycle fluctuates from one week to four weeks, commonly known as "sprints". These sprints of the Agile project management process can be defined and portrayed as the various phases of a development process;

- "The communication of views and feedback is openly and are taken into consideration when determining requirements and establishment". The feedback sessions encouraged by the PM&E supports the communication aspect which is vital throughout a project.

4.2.2.4 Extreme Project Management

Figure 4.4 Typical Extreme Programming

Source: (xPM, 2015)

Since the "goal and solution are not defined clearly at the beginning of the project, Research & Development projects are categorised under xPM approach" (xPM, 2015). The project team has full flexibility which leads to the end-product goals and solutions being defined simultaneously during the various spirals. The important collaboration and communication between the client and the project team during and between phases are in line with PM&E, as the scope of the project is defined at each phase.

The Extreme Programming (xPM) accentuates the importance of research, procedure and feedback, as encouraged by PM&E, through-out the project by means of the multiple spirals. The daily Stand up Meetings are undertaken on a daily basis and the hourly Pair Negotiation promotes the collaboration of all role-players in the communication process, as this bottom-up approach is advised by PM&E - the Extreme Project Management is a participatory and hands-on process, with the role-players playing a pivotal role in order to reach the goals. Feedback, as encouraged by PM&E, through-out the project by means of the multiple spirals. The daily Stand up Meetings are undertaken on a daily basis and the hourly Pair Negotiation promotes the collaboration of all role-players in the communication process, as this bottom-up approach is advised by PM&E.

From the discussions of the above models, it can be concluded that all models are executed more or less in the same iterative sequence – the Phases of the various models are corresponding, with all of them including the aspect of feedback sessions as well as monitoring/control/review/testing. The only difference between these models lies in what the specific Phase is called by the specific model.

Although these models, as discussed above, seem different, the stages are mostly similar. For example, the first phase of a project to be launched is called differently by each model, such as the Planning Step from the Traditional Approach; the IP from the PRINCE2 Model; and Plan Phase from the Extreme Project Management approach.

Another aspect to note is that these participatory models request and support iterative feedback sessions throughout a project, such as the Monitoring and Evaluation of the Planning phase through to the Evaluation phase of the Traditional Approach; the Directing throughout the phases of the Prince2 model; the iterative continuous feedback communication of the Agile Project Management process; and the continuing, constructive communication and involvement from the Extreme Project Management method.

Another similarity of these models is the incorporation of negotiations, such as the Developing of People from The Traditional Approach; Controlling the Stage of the Prince2 model; the Increased Communication and Ownership of the Agile Project Management; and the frequent Communication and Involvement between role-players from the Extreme Project Management approach.

A difference noted in the Prince2 Model and the Traditional Model from the other models, is that the Prince2 Model incorporates a Pre-project Phase and the Traditional Model a Planning Phase. This Phase could include the studying and analysing of the outcome of preceding Actions that could have been undertaken at the location of the new, specific project to be undertaken.

The above participatory models were identified in order to select suitable models for the creation of a framework for a generic participatory process according to which a telecentre could be established and evaluated. The Section consequently presented broad project Phases of the various approaches within the context of models applicable to the Participatory Process – Phases that could be applied to the creation of a framework for a participatory project.

The aim of the next Sub-section will be to identify how to handle each Phase – how to identify the various Actions that could be undertaken in each of these Phases for the establishment and evaluation of a telecentre. The next Sub-section will present various methods and theories regarding the Actions for the framework of a participatory project.

4.2.3 Theories according to which the processes (actions) of the various phases could be undertaken

Projects undertaken by means of the participatory process will be studied in this Section in order to identify detailed Actions to undertake in the framework as identified above in Section 4.2.2. Since this participatory study was undertaken in the agricultural sector in South Africa, specific attention will be given to participatory research undertaken in the agricultural sector, since Scoones and Cousins (1989:3) from Harare, University of Zimbabwe, Department of Agricultural Economics and Extension, who undertook participatory research in the agricultural sector, concluded that the majority of the rural population of Africa is made up of resource-poor farmers, defined as those "whose resources of land, water, labour and capital do not currently permit a decent and secure family livelihood." It could be concluded then that the needs, problems, fears and aspirations experienced by those peoples in the agricultural sector in South Africa may be the same as those of the peoples in another agricultural sector in Africa.

4.2.3.1 The Transfer-of-Technology Model

One of the most influential opinions in the debate on the application of technologies is that of Chambers and Ghildyal (1985:6). Chambers and his co-authors have identified the leading model in the literature regarding technologies, as the Transfer-of-Technology model. In their analysis the main reason why this model has not been effective with regard to resource-poor farmers is because "technologies . . . uphold the signs of the conditions in which they are produced: Similar research undertaken formerly; kinds of needs to be addressed (Lahiff, 2000; Shah *et al*., 2002; Greenidge, 2004:2; Heeks, 2004:3; USAID, 2004); multiculturalism; the proceedings of the evaluations undertaken. They are then adoptable in similar conditions, but often not adoptable where conditions differ" (Chambers & Ghildyal, 1985:6).

The Transfer-of-Technology Model recommends the following aspects (Chambers & Ghildyal, 1985:6):

- Preceding or prior research must be taken into consideration (Chambers & Ghildyal, 1985:6; Perret *et al*., 2003);
- A concept of the research to be undertaken must be explained to the local people (Chambers & Ghildyal, 1985:6);
- The facilitator should listen well and test by means of evaluation (Chambers & Ghildyal, 1985:6; De Vos *et al*., 1991) what was understood;
- Socio-economic needs of research participants should be investigated (Chambers & Ghildyal, 1985:6; Lahiff, 2000; Shah *et al*., 2002);

- Evaluation should be undertaken in any multicultural dialogue (Chambers & Ghildyal, 1985:6; Guijt, 2001; Estrella, 2000).

Chambers and Ghildyal (1985) articulate that the conditions on agricultural researched locations, where preceding research has been carried out, are often similar to those on resource-rich farms. Chambers and Ghildyal (1985) also mention that noticing that the conditions on resource-rich farms vastly differ from those on resource-poor farms it is hardly surprising that the technology and information produced through this method will not meet the needs of the resource-poor farmers.

4.2.3.2 An Alternative Model: Farmer-First-and-Last

The model of Chambers and Ghildyal (1985) suggests an alternative model of agricultural research which entails fundamental reversals of learning and location. In their (Chambers & Ghildyal, 1985) Farmer-First-and-Last Model the researcher starts with the perceptions and concerns of the resource-poor farmers as research participants (Schenk & Grobler, 2009) – according to participatory methods which advocate that the research participants play a pivotal role in the research process – such as a bottom-up approach advocated by various theorists (Berg, 1998; De Vos *et al*., 2001; Schenk & Grobler, 2009). As a consequence, the three basic components of An Alternative Model: Farmer-First-and-Last are that participatory research is a: Distinctive analytical procedure, learning from farmers; it consists of generating technology on the farm and with the farmers; and the evaluation should be one of whether the technology was adopted or not.

4.2.3.3 Alternative types

There are also other theorists and researchers with their own opinions regarding the participatory research methods:

- The type of Andrea Cornwall and Rachel Jewkes (1995) of the University of London, described in their publication *What is participatory research?* the conclusion of their agriculture-related research where they differentiate four means of participation regarding resource-poor farmer participation in a research project, namely “contractual people” (Cornwell & Jewkes, 2007) sharing enquiries and investigations; “Consultative people” (Cornwell & Jewkes, 2007) playing a consultative role before commencement of research; “Collaborative researchers” (Cornwall and Jewkes, 1995) working in collaboration with the research participants; and “Collegiate researchers” (Cornwell & Jewkes, 2007) work together with research participants as colleagues since they have various skills to offer.

- There are several theorists to articulate that most conventional research is contractual - involving local people merely as *informants* – such as Rapid Epidemiological Assessment (Selwyn *et. al.,* 1989) Rapid Ethnographic Assessment (Bentley, *et al.,* 1988) early formulations of Rapid Rural Appraisal (RRA) and Rapid Assessment Procedures (RAP) (Scrimshaw & Hurtado, 1987).

- The following is an abstract from Stone (1992), according to whom participatory research, in which the visibility of the researcher and the transparency of their intentions are significantly greater than in conventional research, present a number of challenges which entail the "control over the research is rarely devolved completely onto the community; nor does the community always want it" (Stone, 1992); "While many practitioners of participatory research have come to it through ethical unease or plain frustration with the inadequacies of conventional participatory research is – what is participatory, research? – certainly not a simpler alternative" (Stone, 1992); "Working with local people is far from easy". Local people may indeed be unconvinced and uncertain regarding spending their time and energy in a project, particularly if they believe that they will not directly benefit by the intervention. Some researchers have found that the communities they want to involve are apathetic to take part in the intervention.

Theories and types from which a participatory project could be developed, from the pre-establishment phase to the evaluation phase, were presented in this Sub-section – the framework and the various Actions for a participatory project. Within these participatory Actions the importance of the evaluation process is constantly discussed and referred to. Since the participatory evaluation method was chosen to be the most valuable and advantageous for such a participatory project, the Participatory Monitoring and Evaluation Method will be deliberated and discussed in the next Section. This is necessary since each Action contains a clear and definite inclusion of evaluation. Consequently the Participatory Monitoring and Evaluation process, as the research methodology and which forms part of each Action will now be explored and discussed in the next Section.

4.2.4 Identifying a research instrument for the evaluation of a participatory project

This Sub-section will present the research methodology, namely the Participatory Monitoring and Evaluation (PM&E) because it is also participatory research and therefore it will form part of each of the project Phases discussed above in Section 4.2.2.

Participatory methodologies such as the Participatory Monitoring and Evaluation (PM&E) Method are often characterised as being reflexive, flexible and iterative, in contrast with the rigid linear designs of conventional science (Chambers, 1992; Schenk & Grobler, 2009;

Russo, 2012). One of the key strengths of the PM&E method is seen to reside in exploring local knowledge and perceptions – researchers take part in research activities (Schenk & Grobler, 2009) as participant observers (Berg, 1998; FAO, 2013). Each phase of a participatory project is completed and evaluated in order to take into account the possibility of having to make corrective measures (World Bank, 2012) before continuing with the next phase – evaluating the effectiveness of the phase (the physical and emotional world).

Involving local, indigenous peoples as research participants (FAO, 2013) in the research in such a bottom-up approach (Berg, 1998; De Vos *et al.*, 2001) will entail that the researcher takes the needs and the wishes of the beneficiaries as the starting point, rather than enforcing his/her own ideas and interests.

During the participatory (Estrella & Gaventa, 1998; Feuerstein, 1986) formative evaluations at the end of each phase of the participatory project, the questions to be asked should not only be formulated in collaboration with the research participants (Coryn, 2011; Russo, 2012), but decisions drawn should be based on the suggestions and proposals of the research participants (Estrella, 2000; Coryn, 2011; FAO, 2013). With the evaluation of such a participatory process, the summative evaluation questions should be formulated in collaboration with role-players, to be discussed with and explained to the research participants. This means that the research participants will have a say in the success/failure of the participatory process (FAO, 2013).

- **Participatory monitoring**

Feuerstein (1986) suggests that monitoring should be undertaken throughout a study focusing on the core aspects of the process in order to identify questions to be asked regarding the objectives; to acquire information to address the questions; to decide the role of all role-players in the evaluation process; and how to optimally use resources (Coady International Institute, 2014).

Participatory monitoring is the methodical and organised documentation and evaluation of applicable information identified by research participants with the assistance of researchers (Krishnaswamy, 2015) as explained below. Krishnaswamy (2015) is chosen to be discussed as he is the most recent and most authoritative theorist who incorporates the latest developments regarding participatory monitoring, namely that the main purpose of Participatory Monitoring is to provide information during the whole process of the project, so that corrections and amendments could be made if necessary (World Bank, 2012); provides information for decision makers; monitors actions and accomplishments by documenting information on a daily, weekly, monthly or periodic basis; and taking time-slots to analyse the information monitored which can provide essential and immediate feedback, and for future

use regarding Participatory Evaluations (Goeke & Kubanski, 2012; World Bank, 2012); Information and data gathered are regularly analysed. Participatory Monitoring is not only keeping account of information gathered, it is also the analysis of information at set times during the project - adding up, discussing and integrating of information (Adams & Garbutt, 2013b) in order to reach agreement regarding the activities in order to reach the objectives.

In conclusion it could be said that before Participatory Monitoring commence, the monitoring process, and the reason therefore, must be explained to the research participants (Adams & Garbutt, 2013b).

4.2.4.1 The benefits of participatory monitoring

The FAO (2015) as an international and foremost agricultural institution, provides the following benefits of the participatory monitoring process:

- **Provides an ongoing picture** (FAO, 2015)

Since participatory monitoring portrays an image of the development of the process, the process could at any stage be measured according to reaching objectives, as well as whether changes have to be made.

- **Problems are identified and solutions sought early** (FAO, 2015)

Since participatory monitoring is undertaken through-out the process, setbacks and difficulties could be identified at an early stage of the process. Problems encountered can involve financing – whether enough finances could be obtained in order not only to set-up the project, but to have enough finances to continue with a sustainable project.

- **Good standards are maintained** (FAO, 2015)

Since participatory monitoring involves regular feedback through-out the various phases, positive results could be expected due to the high quality of the Actions undertaken.

- **Resources are used effectively** (FAO, 2015)

Applied effectively through-out the project, participatory monitoring can distinguish the resources necessary to achieve positive results which will lead to a profitable and practical outcome.

- **Complete picture of project is produced** (FAO, 2015)

When research participants take part in the monitoring, the results are measured according to past evaluations, which present a broader picture than when only an outsider does the monitoring.

- **Information base for future evaluations** (FAO, 2015)

Participatory monitoring offers accurate and credible information for future developments by means of which the researcher and the research participants could take advantage.

To produce a complete picture, Goeke and Kubanski (2012) and the World Bank (2012) suggest that in order to keep track of the Actions of a project, information should be recorded on a regular basis, which will provide important feedback for participatory evaluations. The FAO (2015) suggesting the outline of an ongoing picture to the research participants agree with Adams & Garbutt (2013b) who note that the researcher should ensure that the research participants should understand the Actions of each Phase.

The FAO (2015) notes that problems are identified and solutions sought early which will lead to the fact that good standards will be maintained, which complements Adams and Garbutt (2013b) who are of the opinion that formal and informal opportunities for feedback and review should be created during programme workshops and interviews.

Adams and Garbutt (2013b) are of the opinion that it is necessary that information from field-notes be analysed at feed-back sessions after each action undertaken (discuss, integrate) This will ensure that good standards are maintained (FAO, 2015) while shortcomings are resolved and strategies are improved in order to make collaborative decisions. To produce a complete picture, Goeke and Kubanski (2012) and the World Bank (2012) suggest that in order to keep track of the Actions of a project, information should be recorded on a regular basis, which will provide important feedback for participatory evaluations.

4.2.4.2 Steps in participatory monitoring

The FAO, stipulates the following steps in the participatory monitoring process:

Taking time to prepare and explain the monitoring of a project will ensure that the research participants know why and how they will be monitored. Explaining the monitoring process must include research participants as well as all role-players.

A framework for involving all research participants is explained in the following steps from the FAO, (2015).

Step 1 Discuss reasons for monitoring

The research participants must decide for themselves whether the monitoring will assist them in completing the project (FAO, 2015).

Step 2 Review objectives and activities (FAO, 2015).

PM&E will identify the objectives and activities in the Participatory Assessment Phase. If not involved from the initiation of the project, the research participants could review the objectives and the Actions of the project.

Step 3 Develop monitoring questions (FAO, 2015).

After objectives and activities have been determined, the information needed should be identified and discussed.

Step 4 Establish direct and indirect indicators (FAO, 2015).

Direct and/or indirect indicators to answer each monitoring question should be determined.

Step 5 Decide which data collection methods are needed (FAO, 2015).

The correct data collection method should be appropriate for the specific question. It is also important to note that one data collection method can gather information for various monitoring questions.

Step 6 Decide who will do the monitoring (FAO, 2015).

Specific skills such as establishing good rapport with research participants may be necessary in order to monitor a project. Monitoring a project could also benefit from skills such as empathy and understanding and being able to transcribe field notes into research reports.

Step 7 Analyse and present results (FAO, 2015).

Information should be monitored and analysed throughout the process by means of meetings, community newsletters or by mail in order for the community to be informed whether the process is making progress or whether any changes should be made.

Adams and Garbutt (2013b) call this analysing and presenting of results which is undertaken at the end of a project the summative evaluation. These evaluations should be undertaken by the researcher in collaboration with the role-players of the project (Feuerstein, 1986; Worthen *et al.*, 1997; Coady International Institute, 2014) which is in line with the World Bank (2012) suggesting that this step be taken in order to identify problems and to take corrective actions should it be necessary.

4.2.4.3 Tools and techniques of participatory monitoring

All farmers will assess their own experience of production before and after training in the technologies. Krishnaswamy (2015) specifies the following tools and techniques of the participatory monitoring regarding a farming community:

- To commence, farmers must decide which familiar component the process will be compared to, such as their current circumstances – before and after the development.
- Regarding their yield, the farmers must distinguish whether they have obtained a change, a marginal or a decrease since the development.
- After listing these results, the farmers communicate and discuss the outcome in collaboration with the researcher monitoring the planned and unplanned change they experienced in order to discuss future actions.

The benefits, the monitoring people's participation, the various steps to participatory monitoring as well as the tools and techniques from the participatory monitoring method as postulated by Bergold and Thomas (2012) and the theories of various researchers (Feuerstein, 1986; Worthen, 1997, World Bank, 2012; Coady International Institute, 2014; FAO, 2015) were incorporated in a new method, namely the Participatory Monitoring and Evaluation Method (PM&E), which could form the basis for the evaluation process of a participatory project.

Challenges to participatory monitoring and evaluation are to address the issues of the following aspects (Adams & Garbutt, 2013b):

- Ownership: Who is the owner of the intervention? The researcher should make it clear that the intervention does not belong to the researcher, his/her company, or the donors, should there be any funds donated, but that the intervention belongs to the community;
- Sustainability: The issue of sustainability should be addressed during the planning of the project. These factors should be explained to the research participants at the inception of the project. Continuous monitoring should be undertaken regarding the indicators of the planned sustainability, and corrective actions should be taken when necessary;
- Increased focus on outcomes and processes: The formative evaluation after completion of each action should be discussed and verified with the Management Committee, and should present a useful picture of the success of the actions taken during each phase. During summative evaluation of the end-product at the end of the project, these formative evaluation conclusions could form a valuable basis for the deduction of the summative evaluations.
- Concern over understanding: During the course of the project – from the inception to the post-evaluations – the researcher should ensure that the research participants should understand the actions of each phase. This could only be

achieved by the participatory methodology of the project, where each action is discussed and evaluated in collaboration with the community.

By addressing these challenges, the desirable impact of the project on the beneficiaries as well as the outcome of the project will be reached. The discussion of the results, data analysis and objective accounts of field-work experiences are mainly interpretive, involving descriptions of the phenomena, according to De Vos *et al.* (2001).

The advantages, techniques and the monitoring process of the participatory monitoring school should be included, refined and enhanced to lead to the Participatory Monitoring and Evaluation Method (PM&E) method where the evaluation process of a study is included. This PM&E method will be discussed in the next Sub-section.

4.2.4.4 Participatory Monitoring and Evaluation (PM&E)

PM&E is a monitoring and evaluation process by means of which stakeholders and participants share control regarding the content, the process and the results with corrective actions, during the various levels (World Bank, 2012) – PM&E focuses on the active engagement of the role-players (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; Adams & Garbutt, 2013b; FAO, 2013).

For the involvement of role-players in the process to be meaningful it is essential that they have the opportunity to critique the process and propose revisions or adjustments. In a very real sense the conceptual framework is something which could be adjusted and not cast in stone (Adams & Garbutt, 2013b) from INTRAC, the International NGO Training and Research Centre - and for this to happen formal and informal opportunities for feedback and review should be created during programme workshops and interviews (Adams & Garbutt, 2013b).

Feedback (Estrella, 2000; Coryn, 2011) is perceived as useful if it assists in decision-making. The relationship between an evaluation and the impact thereof is difficult – studies sometimes fail to influence short-term decisions, and studies without influence can have a delayed impact when more favourable conditions arise. Coryn (2011) emphasise that there is, though, a broad consensus that the major goal of evaluation should be to influence decision-making through the provision of empirically-driven feedback, concurring with Feuerstein from the eighties (Feuerstein, 1986).

- **Participatory evaluation**

Participatory evaluation according to the PM&E method (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; Adams & Garbutt, 2013b; FAO, 2013) is important, since by means of participatory evaluation (Feuerstein,

1968; Estrella, 2000; Coryn, 2011) the researcher will be able to validate the findings, because it is based on the viewpoints, opinions and suggestions of the research participants (FAO, 2013). Formative evaluation is undertaken throughout the project and summative evaluation at the end of the project. These two aspects are discussed below.

- **Formative evaluation** (De Vos *et al.,* 2001) should be undertaken at the end of each phase of the participatory project. Formative evaluation, which is conducted during the development of a community, should be conducted by an internal or an external evaluator (Weston *et al.*, 1995) such as the researcher in collaboration with the role-players (Coady International Institute, 2014). Feuerstein (1986), Worthen *et al.* (1997) and the World Bank (2012) add that the participatory formative evaluation refers to continuously monitoring, with a view to identifying problems and opportunities, in order to remedy shortcomings and improve strategies during the project and validate or ensure that the goals of the venture are being achieved by means of identification and remedying of problematic aspects (Weston *et al.,* 1995; World Bank, 2012).
- **Summative evaluation** researches at the impact of an intervention on the community – finding out what the project achieved. Participatory formative evaluation is undertaken during the project establishment (Feuerstein, 1986), but participatory summative evaluation is undertaken mostly at the end of the project, such as at the end of the participatory project, in order to interpret results and determine whether objectives have been reached articulate Adams and Garbutt (2013b). It could therefore be concluded that summative evaluation, refers to an end-of project (Jones, 2013) assessment of achievement, cost-benefit and impact of the project, including lessons learnt and guidelines for the possible establishment of a telecentre.

Summative evaluation can also be referred to as *ex-post* evaluation (Jones, 2013) – meaning at the end of the evaluation of the participatory project. Summative evaluation is outcome-focused more than process focused.

With a study on evaluating a participatory project, summative evaluation will include aspects such as the results of the participatory discussions with research participants (Feuerstein, 1986; Coady International Institute, 2014) and demonstrations as well as whether the research participants have obtained new, applicable knowledge (Bekenstein, 2003; FAO, 2006a; McCarthy, 2006) in order make optimal use of the information and communication technologies.

In this Sub-section, the various aspects and applicability of the participatory monitoring were discussed and evaluated to enable the identification of whether the participatory monitoring method could be applied to a participatory project regarding establishment and evaluation of an institution. Evaluations of the participatory monitoring led to the identification of the PM&E method as the most suitable and reliable method to evaluate a participatory project.

4.2.4.5 PM&E: Evaluating the sustainability of the South African agricultural telecentre

In the previous Section the PM&E method was identified as the most dependable and suitable method for the evaluation of a participatory project. This recognized PM&E method can be applied not only for the establishment, but now also for the evaluation of a rural agricultural telecentre project. Consequently the question could be asked whether a successfully operating telecentre would be sustainable. This important aspect is evaluated in this Sub-section.

In the developing agricultural sector in South Africa where most farmers are small-scale and illiterate, the environment (Mikkelsen, 1995; Berg, 1998) can be severe and extremely inconducive – especially in the Limpopo Province where this study was conducted. Although Agunga (1998) described general and customary communication in the agricultural sector, this project entailed the establishment and evaluation of a telecentre at the Thabina irrigation scheme with the aim of ensuring global communication structures. The community involved in an agricultural study is a developing agricultural community, which has its own basic, agriculture-related information needs as well as socio-economic and ICT needs, described in Chapter 5. The agricultural telecentre has a definite developmental component, and not only communication, but also agriculture-related as well as institutional interconnection. A negative environment can influence a telecentre which held so much promise when established (Appendix A).

The extreme poverty of many rural communities at small-scale irrigation schemes, especially in the former homelands in South Africa, is well known, mainly due to unemployment and a lack of resources (Appendix A) to assist them to make a decent living (Kirsten & Van Zyl, 1998; Van Averbeke, 2006) and they differ vastly from the international telecentres. The situation of an agricultural community is therefore typical of these rural communities, as the minimum support is offered by government. It should also be noted that such communities are extremely exposed to the fluctuations of the environment and with dreadfully little assistance from government they would not be able to survive economically. And without

employment outside the irrigation scheme, the fate of the scheme is also the fate of everybody and everything about the community which runs the irrigation scheme.

During participatory discussions all stakeholders together with the researcher must decide and approve whether the sustainability of telecentres can be viewed on financial aspects alone (Colle, 2006; Fundacion Chasquinet, 2006; Stoll, 2006; McConnell, 2007). The agricultural telecentre should be evaluated according to the following recommended principles: (Colle, 2006; Fundacion Chasquinet, 2006; Stoll, 2006; McConnell, 2007) *social and cultural sustainability* (if people feel empowered by the telecentre they will keep it running); *political sustainability* (the regulatory framework to protect, promote and support the telecentre with attention to the specific needs of the farmers); *technological sustainability* (telecentres need not operate with the latest technology and full maintenance should be ensured); and *financial sustainability* (the continuous availability of the necessary funds to service all developmental, operational and maintenance needs of the telecentre. The following Sections will describe how to evaluate the sustainability of the agricultural telecentre according to the categories suggested by the above theorists and researchers.

- **Social and cultural sustainability:** The social and cultural activities (Harris, 2003, Fundacion Chasquinet, 2006) of the agricultural telecentre should be evaluated as successful. Various activities must be effectively undertaken and will then play a role in the generation of income for the agricultural telecentre:

According to PM&E the secretary must be able speak the local languages and she must translate the messages received by phone and fax into these local languages for the farmers. The means of her communication with the farmers must be interpersonal (Pant, 2013) as the communication system of rural farmers is oral communication.

Documents regarding the running of the agricultural telecentre must be compiled in participatory conversations, as promoted by PM&E, with the researcher and those members of the Management Committee who are literate. The secretary must type the documents which could be mostly faxes to the DWA. Since PM&E supports the inclusion of indigenous languages, most of the letters addressed to the farmers can be written in the local language. Correspondence with the DWA, DAFF, ARC and other agriculture-related organisations can be in English. The secretary can also translate and explain the contents of the books, manuals and newspapers in the library to interested farmers. Documents can also be typed, printed and copied for learners of the surrounding schools and colleges, which may include documents that vary from assignments to job-hunting documents and CV's.

Other social and cultural aspects that can be included are that all the children in the surrounding villages of the agricultural telecentre can be vaccinated by a nearby clinic and it

could be organised with the clinic to give presentations on health aspects such as HIV/aids, nutrition, child care, etc. (McConnel, 2007) – the agricultural telecentre can play a pivotal role in addressing the socio-economic and ICT needs of the community, as it should be the secretary who suggests the vaccination of the children of the surrounding communities as well as the lectures regarding nutrition, HIV/Aids, child care and other health-related issues (McConnel, 2007).

- **Political sustainability:** The evaluation of the political sustainability of an agricultural telecentre can prove to be positive due to the involvement of the power relations, as preferred by PM&E. In order to include a participatory mechanism and local power relations, the Chief of the tribe to which the farmers belong gave his support from the inception of the study (Colle, 2006). The Management Committee must explain the concept of a telecentre to him in order for him to see it as an attribute for the development of his tribe and community.

The Management Committee themselves must also support and protect the activities of the telecentre, especially to address the specific needs of the farmers, as recommended by PM&E. They must not only support the determination of the socio-economic and ICT needs of the farmers that can be undertaken by means of an interview schedule, but must also take part in the completion of the interview schedule. In South Africa, the Resis Programme (Appendix O) can alleviate many economical and environmental problems of the small-scale irrigation schemes where the agricultural telecentre is situated.

- **Technological sustainability:** The technological sustainability of the agricultural telecentre can prove to be positive. Deducted and applied from the Concise Oxford Dictionary (2008), technological sustainability is the measure of the maintainability of the applicable information and communication technologies, with the purpose of addressing the agriculture-related information needs as well as socio-economic and ICT needs. This means that technological sustainability is the support and the provision of information and communication technologies which does not necessarily need to constantly be on hand provided it is a locally available service that is sufficiently responsive (Fundacion Chasquinet, 2006).

The research participants of a small-scale irrigation community, as well as from the surrounding institutions, can be transformed from recipients of technological know-how to positive users of the technologies, as a well-trained secretary at the agricultural telecentre can adapt the high-tech information received from the information and communication technologies into the local language as prescribed by PM&E (Colle & Roman, 1999; Benjamin & Dahms, 2004). The secretary can also distribute information by means of the

fax as well as the indigenous communication system, oral communication. She can assist greatly in the computerising of the managerial system as well as the financial system. She can also type various assignments for the learners in nearby schools and colleges. Copies can also be made from newspaper articles and books from the library.

Secretaries at agricultural telecentres may easily fall into contentment by using well-operating information and communication technologies. But being confronted by technical problems such as a monitor not working properly or software not performing, could be highly frustrating – especially at a telecentre at an irrigation scheme kilometres away from a town providing technical support. The average agricultural telecentre operates with a computer, the telephone and the multifunctional printer. These are information and communication technologies that can be acquired from a supplier from the nearest town, and who must undertake to honour the guarantee and to be available for any maintenance when necessary in the future.

- The researcher wishes to add another type of sustainability in this Section, namely the **technical sustainability** which is needed to be able to understand, operate and maintain the information and communication technologies as such. The information and communication technologies at an agricultural telecentre must be installed by professionals in order to ensure future maintenance. The manager of the company must explain to the secretary and the Management Committee in detail how to operate the information and communication technologies. The computer must be installed by the IT Section of the Department free of charge and, according to PM&E, those persons who utilise the information and communication technologies must receive extensive training in the usage of the information and communication technologies. If the agricultural telecentre is situated in the Limpopo Province, LDAFF can also install the Uninterrupted Power Supply (UPS) as suggested by Jimba (2003) and Aditya (2006) which prevents power failure and serves as a warning to save documents well in time. The UPS also serves as a lightning protector, which is extremely important at the agricultural telecentre located in the Limpopo Province well known for its thunder storms. The secretary must switch off all information and communication technologies every day when leaving the telecentre after work.
- **Financial sustainability:** The financial sustainability of the agricultural telecentre can prove to be successful, as it can be measured by the various methods with examples of outcomes presented below. The availability of the necessary funds to cover the operation of the telecentre, as recommended by PM&E, is important. But, for instance, an agricultural telecentre in the Limpopo Province, usually receives a

minimal amount from government (Rao, 2008; Lekoko, 2010) and has to buy the information and communication technologies with donor funding. The secretary at an agricultural telecentre usually budgets for short-term operational expenses like insurance and stationery such as paper, cartridges, etc. These necessities are then purchased with funds received from users of the telecentre for typing of various documents, making photo copies, sending and receiving faxes, using the telephone, etc. No developmental expenses to address the agriculture-related information needs or the socio-economic and ICT needs should be needed, as the library and the telephone can provide and supply sufficient and adequate material for queries regarding the farming practices. The lectures on health issues as well as the vaccination of all the children must also be offered at no cost from the nearby clinic as part of their social responsibility (FAO, 2013). As with all Water Users Associations in South Africa, the irrigation scheme is obliged by the NWA to pay an annual Catchment Management Charge to the DWA. Usually, at the irrigation scheme, each farmer contributes his amount towards this charge on a monthly basis to the irrigation scheme's financial system. If a telecentre cannot function on providing and selling technology services alone (Fundacion Chasquinet, 2006) the Management Committee can agree, in collaboration discussions as proposed by PM&E, with all farmers and the researcher, that an extra contribution of about R3 per farmer be added to each farmers' levy amount in order to make provision for unforeseen costly maintenance of the information and communication technologies that might occur, until the telecentre has created a sound foundation in order to operate by itself. There can be, for instance, a new drum to be bought for the printer.

Future researchers in the developing farming sector at small-scale irrigation schemes in South Africa should take into consideration the severe limitations placed on the sustainability of such schemes by the fact that South Africa is a water-scarce country and that the availability of adequate water for irrigation often poses a serious obstacle in this regard. At a newly established agricultural telecentre it may prove that a computerised financial and management system cannot only provide crucial management information to the WUA but also play an important role in deciding on preventative measures as well as providing the role-players with valuable options on how to overcome economic obstacles. This is especially important where a WUA is established and where the farmers have to carry all financial costs themselves.

This Sub-section investigated and explained the various elements and branches to which the sustainability of a rural-agricultural telecentre in South Africa could be understood, observed

and evaluated. In the following Sub-section, the qualitative and quantitative data collection methods that could be applied to evaluate a participatory project are explored.

4.2.5 Data collection methods to evaluate a participatory project

It is important for the researcher to select appropriate and related data collections methods, taking into consideration the various demographic aspects, such as language and literacy of the research participants. The qualitative as well as the quantitative data collection methods that could be used for evaluating a participatory project will be described below. Qualitative data collection methods will be discussed first.

4.2.5.1 Qualitative data collection methods to evaluate a participatory project

- **Participant observation** is defined by various researchers and theorists as a procedure in which a researcher establishes a lasting relationship with research participants within their environment, creating mutual understanding in order to commence with the development process (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of Participant Observation, 2007; World Bank, 2012; Pant, 2013). Pant (2013) cautions, though, that during participant observation the researcher is not only emotionally engaged with the research participants, but that the researcher is also an unbiased, impersonal observer of others (Pant, 2013), always being aware of this situation (Henning *et al.*, 2004). In participant observation the researchers must engage as objectively as possible in the everyday activities of the research participants (Cornwell & Jewkes, 2007) in order to collect factual information.

  With participant observation the gathering and collecting of information entails the actual observation of the research participants and the compilation of analysis (De Vos *et al.,* 2001). In such a participatory project, the discussions with the research participants are carefully noted by the researcher in his/her own language. Since the language of the researcher and that of the research participants of this study were not the same language spoken, the quotations made in this study are not the direct words of the research participants but a version of the researcher to present the spirit of the message of the farmer: As per interactive research, and although presented in quotation marks in the study, it represents and indicates the intention of the discussion with the particular person as closely and correctly as possible to the actual meanings of his/her own words as voiced by him/herself. Feedback sessions where these notes are discussed with the Institutional Management form an essential part of participant observation (World Bank, 2012); are the central element of participatory research; and it presents comprehensive, accurate and detailed information of the research participants studied (Berg, 1998). Being the researcher's comprehension of what is 'there' (Henning *et al.*, 2004) the

analysis of the field-notes should be undertaken immediately after every excursion into the field (Pant, 2013) and should ideally comprise a comprehensive version of the research participants themselves, the events that took place, the actual discussions and communication, as well as the attitudes, perceptions and feelings of the observer (De Vos *et al.,* 2001; World Bank, 2012).

The Chicago School of Participant Observation (2007) supports this view regarding the pivotal role of the researcher and notes that participant observation is not only a personal challenging method, but also a methodically demanding method of social research to carry out. It requires researchers to spend a great deal of time in an unfamiliar environment; relationships with people with whom they have little affinity must be secured and maintained; lots of day-to-day notes should be taken regarding (Pant, 2013); some personal risk could be experienced in their fieldwork; and months are spent on analysis after fieldwork, analysing field-notes (O'Farrell & Norrish, 2006) and presenting feedback (World Bank, 2012). On the positive side it could be noted that to researchers who are prepared and willing to undertake participant observation, this rewarding method presents interesting understandings into people's social lives and relationships. By considering participant observation, the question arises of what the characteristics of participant observation entail.

Various theorists (Mikkelsen, 1995; Berg, 1998; De Vos *et al.,* 2001:276-277; Pant, 2013) regard the following as most important characteristics of participant observation:

- The researcher endeavours to gain an in-depth insight into the experiences of the research participants (Pant, 2013). The researcher should take field-notes of all overt as well as covert communications. He/she must then discuss these field-notes with the research participants in order to realise and note what the experiences entail – "When in doubt, collect facts" (Mikkelsen,1995:249);
- The focus is on the everyday lives and experiences of the research participants (Pant, 2013). "The researcher lives the reality of the research participants" – he/she lives within their homes, together in the field and during the whole research process (Berg, 1998; De Vos *et al.,* 2001:276). The researcher must appreciate the situations rather than trying to correct them;
- The researcher should be acquainted with the customs, lifestyle and cultural contexts of the research participants (Pant, 2013). The researcher must live in the way of life of the research participants –means of customs and cultural contexts like language, households, daily activities and religion. It should be noted also that the researcher must be "mindful not to bar future researchers'

access by careless protection of the research participants' rights and privacy" (Mikkelsen, 1995; De Vos *et al.,* 2001:276);

- The researcher becomes part of the lives and daily practices of the research participants (Pant, 2013). The researcher becomes one with the research participants, he/she interacts with them in their daily routine of "customs and activities", also in a private context. In other words, be descriptive in your field-notes (Du Plooy, 1995; Berg, 1998; De Vos *et al.,* 2001:277);
- The researcher plays the twofold role of data-collector and data-interpreter. The researcher notes all activities in field-notes and by means of participant observation, the researcher observes how life is lived by the research participants – only to distance him/herself afterwards in order to analyse the results obtained from the field-notes. These results are then again discussed in a participatory manner with the research participants in order to maintain reliability (World Bank, 2012). The essential principle aims to understand another way of life from the indigenous point of view (Berg (1998);
- As participant observer, the researcher becomes part of the situation and condition being observed and even contributes to the situation (Pant, 2013). The role of the researcher is set among all research participants as the researcher also makes suggestions and contributions (World Bank, 2012). This means that a "variety of information from different perspectives are collected" (De Vos *et al.,* 2001:277). Good rapport could be established with the research participants;
- The researcher should be as involved as possible while maintaining an "analytical perspective grounded in the purpose of the field work" (Mikkelsen, 1995:248). Since the researcher is involved over a period of time with a particular situation, the objectivity of the researcher may become a problem: The researcher conforms to the way of life of the research participants, because he/she must live life the way the research participants do. The researcher has to adapt to the culture, the norms and the habits of the research participants. This could ensure that the researcher will maintain an objective stance.

The following Table below shows and presents the advantages and disadvantages of participant observation:

Table 4.1: Advantages and disadvantages of participant observation

Advantages
Provide complete information about behaviour of individuals and groups (Mikkelsen, 1995; Pant, 2013);
Permit the researcher to enter into and understand situation/context (De Vos *et al.,* 2001);
Provide good opportunities for identifying unforeseen outcomes (FAO, 2013).
Exist in natural, unstructured, and flexible setting (Henning *et al.*, 2004);
The observer is less prominent and will reach an objective experience (De Vos *et al.,* 2001);
Data is collected directly and not retrospectively (Chicago School of Participant Observation, 2007; Pant, 2013);
Gives an all-inclusive perspective on the research problem under investigation (Mikkelsen, 1995);
Aims at in-depth investigation of a problem and is of a qualitative character (Chicago School of Participant Observation, 2007; World Bank, 2012).
Disadvantages
Costly and time consuming (Chicago School of Participant Observation, 2007);
Needs well-qualified, highly skilled observers and may need to be experts on the subject (Chicago School of Participant Observation, 2007);
May have an effect on behavior of research participants (De Vos *et*

al., 2001);
Selective judgment of observer may distort outcome (Mikkelsen, 1995);
Researcher has little control over circumstances (Henning *et al*., 2004);
Behaviour observed may be different than anticipated (De Vos *et al.,* 2001);
Research participants may not act naturally if an outsider is present (Chicago School of Participant Observation, 2007);
Reliability may be a problem – Sometimes difficult for researchers to ensure that their findings are valid, simplification of findings could be an obstacle (Mikkelsen, 1995);

Source: Researchers compilation of various theorists' opinions

In this Sub-section the participant observation as the main qualitative data collection method of a participatory study was explained. In the next two sections the additional two qualitative data collection methods of a participatory study will be discussed, namely the feedback session and the structured interview.

- **The feedback session as a data collection method**

Formal feedback discussions follow after observations for specific purposes and it is important that the researcher as well as the research participants are fully prepared for the feedback session. Discussion is the predominant mode of data or information collection in qualitative research (De Vos *et al*., 2001).

After the session the researcher should complete any outstanding documentation and undertake agreed follow-up activities. The researcher should examine opportunities for corrective actions. If applicable, the researcher should set a date for the next feedback session.

- **Structured interviews as a data collection method**

Structured interviews should complement participant observation as one of the qualitative data collection methods. Researchers rely extensively on structured interviewing as a data collection method, which can be described as "a conversation with a purpose" (Du Plooy, 1995:112; Chicago School of Participant Observation, 2007). Structured interviews used in the evaluation of a participatory project provide a detailed context about the specific answers of the research participants; the covert communication of the research participants; and it provides information regarding the research participants' opinions, values and feelings, as suggested by Du Plooy (1995).

The interviewers should ask the research participants to respond to all questions (Berg, 1998). This leads to the views of De Vos *et al.* (2001) that all interviews are interactional procedures and actions, and interviewers are entirely involved in creating (Adams & Garbutt, 2013b) during conversations with the research participants. Both parties, the researcher and the participants, are thus necessarily and unavoidably active and involved in the process of attaching meaning (De Vos *et al.*, 2001).

As early as in 1995, Mikkelsen noted that structured interviewing, which accompanies almost all other investigative methods in current development work, has been developed to enhance the knowledge, attitudes and activities of the research participants (Mikkelsen, 1995). It could be deducted then that the structured interview is designed to obtain information using a set of predetermined questions that are expected to indicate the participants' thoughts, opinions and attitudes about the research aspects (Berg, 1998). This is important for a participatory project, since these procedures should lead to the belief that the research participants will give a "true" or "real" personal version of facts, opinions and feelings as they experience it (Henning *et al.*, 2004:53; Chicago School of Participant Observation, 2007). This leads to the question of how these structured interviews are conducted.

For structured interviews, leading role-players are selected as research participants such as homogeneous groups (Du Plooy, 1995; Mikkelsen, 1995). Mikkelsen (1995) is of the opinion that an interview in group format with an interviewer may provide sounder and more reliable information than could be obtained in a much more lengthy exercise of individual interviews with the same people. Researching by means of structured interviews, and analysing and interpreting the data, involves many challenges as there are no rules for determining meaning – there are no rules except to do the very best to present the data objectively and to communicate what the data reveal (Mikkelsen, 1995).

Berg (1998) and the FAO (2013) are of the opinion that researchers should ensure that the questions scheduled for their structured interview are adequately comprehensive in order for the research participants to present information relevant to their research process's topic – the interview schedule for the evaluation of a participatory project should be confirmed with Institutional Management, forming part of the research participants. The data obtained are regarded as credible and authentic (Adams & Garbutt, 2013b) so long as the data were not ruined in the consistent procedure of non-interference from the interviewer (Du Plooy, 1995; Henning *et al.*, 2004; Chicago School of Participant Observation, 2007) – the norm is guidance without interference from the interviewer. It is also necessary to start with general relevant areas like demographics. This is important, as it could put the research participants at ease with the interview schedule (Appendix F), as it would contain familiar information that

is not difficult to answer. The aim of this approach is also to ensure that all respondents are presented with exactly the same questions, and in the same order. This ensures that reliable responses can be gathered and that comparisons could be made with confidence between different survey periods.

Du Plooy (1995) suggests the following general guidelines when asking questions during an interview:

- Only the questions in the interview schedule should apply, especially in the evaluation of a new intervention such as the four-phase participatory process;
- The exact wording of the questions should be used;
- All questions should be asked in the sequence of the interview schedule;
- If a respondent misunderstands or misinterprets a question, the question should be repeated.

This Sub-section explained the three qualitative data collection methods to be followed in a participatory project. Following below, is an explanation of quantitative data collection methods that could be followed in a study for the evaluation of a participatory project.

4.2.5.2 Quantitative data collection methods

Quantity is primarily a number of something (Henning *et al.*, 2004) and the quantitative approach is more regulated, structured and measured than the qualitative approach (De Vos *et al.*, 2001). Quantitative research methods entail a more exact construction with a high regularisation, with low flexibility in the research design it is primarily deductive (Mikkelsen, 1995). The typical data collection method is the questionnaire with closed questions, as well as the measuring of the usage of information and communication technologies introduced.

- **Questionnaires***:* The following is based on concepts and techniques of Lakoff (1990); Cohen *et al.,* (2000) and Tashakkori and Teddlie (2000):
  - The first type of question demands a quantitative answer. Examples are: 'How many students choose to study education?' (Lakoff, 1990; Cohen *et al.,* 2000) which could be adjusted into questions such as: 'How many research participants agree to an intervention at their community?; How much time was spent at the intervention?; How many kilometres are you away from the intervention?' We need to use quantitative measures to answer these kind of questions;
  - Numerical change can be accurately researched by using quantitative methods. Are the numbers of students in our university rising or falling? (Tashakkori & Teddlie, 2000), could be changed into questions such as 'Are

the numbers of the research participants using the new mechanisms increasing or decreasing?' The hourly mean for the usage of a specific mechanism during a month should show there is a rising or falling tendency. Only a quantitative study could calculate;

- Quantitative research is especially suited for the testing of hypotheses. When we want to explain something – we could look at the theory and come up with the sub-questions using quantitative research (Lakoff, 1990), such as whether 'a participatory project could be evaluated successfully?' Questions of a questionnaire regarding specific needs of the research participants should be formulated in such a way to identify whether the sub-questions of the study are adequately focused and effectively dealt with (Appendices O and P): The current exposure of the research participants to the new mechanisms, with questions such as the availability, exposure and the need for the new mechanisms as well as the willingness to pay, as well as the conditions for the usage of the new mechanisms; questions on the various types of information the research participants need and to disseminate; and whether the research participants have to travel and how much they could save (money and time) if the intervention were closer to them.

4.2.6 Sample design

Regarding farmers as research participants, a list with names of the farmers, the number of farms/plots for each farmer as well as the farm/plot number should be compiled or obtained. The criteria for the sample design should be identified by the researcher in close collaboration with the Institutional Management. This is due to the fact that the researcher would be an outsider and also because the Institutional Management would have relevant and valid information regarding the farmers. The following criteria could be used in order to draw up a sample for farmers:

- Age – there might be a difference in the acceptance of the new ICT from the elderly and the younger users;
- Gender – women might have different, additional needs than men;
- The number of plots possessed by each farmer – income might influence affordability; and
- Location/wards – it might be easier to access the telecentre for those closer to the venue.

Regarding the agricultural sector where small-scale farmers, mostly illiterate, undoubtedly have not been exposed to complete questionnaires before, the researcher should explain by means of participatory discussions what such a survey would entail and how it would be undertaken, making use of the support of translators such as Extension Officers in order to ensure that each participant would understand and comprehend each question asked.

Population parameters for farmers could be based on various characteristics shared, such as they cultivate the same crops; they are all irrigating farmers; they all belong to the same WUA; they all wanted a telecentre; and they had no, or minimal, access to information and communication technologies that could be provided by a telecentre.

The following criteria could be used for drawing a sample of farmers for a telecentre project: Age (elderly respondents might not know about the information and communication technologies and be fearful of their use, while younger people might know about information and communication technologies and be eager to learn the operation of the information and communication technologies); gender (it might be necessary to determine whether the women farmers would be interested in obtaining information on aspects such as tele-medicine, tele-schooling, etc.; the number of plots possessed by each farmer (respondents with more than one plot might be more able to afford using the information and communication technologies at a nominal fee); and, location of farms/wards (respondents nearer to the telecentre might use the telecentre more often).

4.2.7 Determining the sample size of farmers for a structured interview in order to assess whether the farmers do need a telecentre

The application of the equation below is described and explained in Sub-section 6.4.2 determining the socio-economic and ICT needs of the farmers: Action 2.

A random stratified sample of 84 farmers was chosen from the 150 farmers for the identification of a survey population, according to the following equation:

Sample size = Z^2 x StdDev x (1 – StdDev)/$(ME)^2$

where: Z = Standard Score = (X - μ)/ StdDev where X is the value of the element, μ is the population mean; StdDev = Standard Deviation; and ME = Margin of Error. Where a relative expectation exists that by far the majority of the population would indicate that they do want the intervention, a relatively small StdDev could be expected. From a departure point a StdDev of 10% could then be assumed as well as a Confidence Level of 95%.

The above indicators will then lead to a minimum sample size of 150 farmers as the target population.

4.2.8 Data analysis

Feedback sessions at the end of each Action by means of participatory discussions with the Institutional Management (community representatives) should provide reliable analysis of the success of the specific Action (Adams & Garbutt, 2013b). Formative evaluation at the end of each Phase should present a reliable picture of the data gathered during the Phase (De Vos *et al*., 2001). Summative evaluation at the end of the participatory project where all formative evaluations are merged should indicate whether the objectives have been reached and whether the project was successfully conducted (De Vos *et al.,* 2001).

SECTION I discussed the theory regarding the more appropriate theories and approaches that could be applied in the creation and execution as well as evaluation of a participatory project. It included the data collection methods, sample design and data analysis for a participatory project. SECTION I could be applied in the creation of a generic Participatory Programme, which actions should be followed and how each phase of the project is to be evaluated. SECTION II will now explore which of the above theories presented in SECTION I

SECTION II

This Section will discuss the research methodology, namely the Participatory Monitoring and Evaluation (PM&E) and how it will be applied to the various participatory Phases. In the literature above it was identified that all the Phases (framework) for a participatory project to be undertaken, seem to be similar and thus these theories will be studied and investigated in this Section in order to identify and create a framework for a process which could form the basis of a participatory project for the establishment and evaluation of a telecentre. But the Actions to be identified in this Section will be generically linked and related to an agriculture-related participatory project. SECTION II will therefore systematically argue as well as thoroughly debate all the theories and models discussed in SECTION I in order to identify which of these above theories will be more appropriate to be used for the development of a generic four-phase participatory process, based on the above theories which all include the research method, namely the PM&E.

4.3 PROJECT AND RESEARCH: PARTICIPATORY THEORIES TO USE FOR THE CREATION OF A GENERIC PARTICIPATORY PROCESS

Theories for the creation of a generic four-phase participatory process, created according to the various methods, theories and models above (Section 4.2) chosen and refined for a participatory study are presented below, followed by an explanation of the actions to be taken during each consecutive phase of the participatory process, according to the theories of the above Sections.

4.3.1 Theories and approaches to be used for the creation of a framework for a generic model of a four-phase participatory process

In the following Sub-sections, the various approaches and theories will be identified in order to create a generic participatory process.

4.3.1.1 The Traditional approach

From the Traditional approach, the Planning step will be applied in the creation of the Pre-establishment Phase (Phase I) in order to include the various actions that included preceding research as well as negotiations towards the establishment of a telecentre, including demonstrations of the planned ICT to be used in the telecentre. The Planning step will also be applied for the creation of the Preparatory phase of the framework, in order to accommodate actions that should be undertaken in preparation for the establishment of a telecentre, namely the compilation of various documents, including the Project Plan. As a preparatory action, the identification of the socio-economic needs was also seen as a preparatory action. The Measuring and Evaluation step will be applied to the creation of the framework in order to create feedback sessions after each Action as well as creating the Participatory Evaluation phase of the framework for the generic model, where the success or failure of the project is evaluated summatively.

4.3.1.2 PRINCE2 Model

The PRINCE2 Model points out that starting up or initiating a project is the first step (IP) which will be used to create the Pre-establishment phase for the framework of the generic model. Planning is an underlying aspect of the PRINCE2 Model that is needed in order to manage and control a project. The planning (IP) will be applied to the generic model for the Preparatory phase in order to cover preparatory actions such as the identification of the socio-economic needs and the appropriate ICT that could address these needs. The Managing Stage Boundaries (SB) of the PRINCE2 Model were transformed into an Establishment Phase of the framework of the generic model which will comprise the actual establishment of the telecentre with actions such as the acquisition of the ICT, its installation and the training of the key-personnel in the usage thereof. An important disadvantage of the PRINCE2 Model is that this model does not comprise any evaluation or monitoring step.

4.3.1.3 Agile project management

From the Agile model the identification of Dynamic Requirements, Delivery and Deployable Products will be applied to the creation of the framework for the generic model in all Phases to be created.

4.3.1.4 Extreme project management approach

The Extreme project management approach (2015) will be included in the study as the project team has full flexibility which includes iterative communication and involvement with the client.

An explanation of how theories will be applied in the creation of the framework for the generic four-phase participatory process, was presented. From theories above it could be concluded that all the Phases seem the same. These theories on the Phases will be applied to the compilation of the various Phases for the generic four-phase participatory process. Actions to be identified in the next Section will be applicable to an agricultural, rural project.

4.3.2 Theories and approaches used for the identification of Actions for the generic model of the four-phase participatory process

This Section will present an evaluation of the Actions identified in Section I and the actions required for small-scale participatory project planning, design and research (evaluation), will be identified.

4.3.2.1 Participatory research

The Participatory research was chosen for this study, as it takes into consideration the perceptions, ideas, knowledge and suggestions of the research participants in the design, planning and implementation of their project (Mikkelsen, 1995). A central part of the participatory research is the continuous and comprehensive feedback of all actions undertaken during the development process. Coryn agrees regarding the importance of feedback and notes (Coryn, 2011) that feedback presents to the researcher the thoughts, beliefs and views of the research participants during the development process. Feedback (Estrella, 2000; Coryn, 2011) from the researcher to the local people should ensure that the decisions confirm the views of the research participants.

4.3.2.2 The Transfer-of-Technology Model

The research of Chambers and Ghildyal, (1985) will be applied to the study, as this gap in the literature could be filled with this study by means of this generic four-phase participatory process, created in this study, being adapted for the evaluation of the process to establish a telecentre, a Trust, a Cooperative or a Community Development Programme – situations where conditions do differ. Therefore this four-phase participatory process fills a gap in literature, and has consequently adjusted, tailored and modified the data and ideas of this Transfer-of-Technology Model in order to create a method for evaluating the four-phase

participatory process, accommodating illiterate subsistence farmers, regarding the following aspects:

- **Preceding or prior research** undertaken at the research location will be taken into consideration (phase 1, action 1);
- The **concept** of the research to be undertaken will be explained (De Vos *et al*., 2001) (phase 1, action 2);
- The researcher will **pay attention, take field-notes and test** what she has understood with the research participants during feedback sessions (Schenk & Grobler, 2009) (throughout the study);
- **Socio-economic needs** of research participants (farmers) will be determined by means of structured interviews (Lahiff, 2000; Shah *et al*., 2002) (phase 2, action 2);
- PM&E, according to the theories of Guijt (2001) and Estrella (2000) will be undertaken in a **multicultural dialogue** (throughout the study);
- **Guidance and coaching** on the new mechanisms will be presented to the research participants (Colle, 2006) (throughout the study);
- **Each phase will be evaluated formatively**, which, according to De Vos *et al.* (1991) entails feedback on each action of the participatory process (throughout the study).

Differing from their study, this study is undertaken on resource-poor farms, which fills a gap in literature regarding the agricultural sector**.** Although the conditions differ vastly, it will be demonstrated by the study that a telecentre, based on information and communication technologies, could provide the appropriate, required communication strategy to meet the information needs of these small-scale farmers. These information needs are identified by an information needs assessment, as will be undertaken in the study.

4.3.2.3 An Alternative Model: Farmer-First-and-Last

The research of Chambers and Ghildyal (1985) is based on the perceptions and ideas of the research participants. The needs, problems and opportunities of the research participants will be researched, and the researcher will have suggestions in his/her consultancy role supporting the resource-poor community, which is consistent with this study. Success will be judged by the usage of technology by the research participants.

The Alternative Model: Farmer-First-and-Last is relevant to the study. Since this model was seen as useful and applicable to the study, these three basic components of the Farmer-First-and-Last model will be integrated with the generic four-phase participatory process of

the study. The aspects of the Alternative Model: Farmer-First-and-Last which will be integrated in the study are summarised as follows:

- **A distinctive diagnostic procedure, learning from farmers**;
    - For the discussion on conclusions of the interview schedule, feedback sessions will be held in collaboration with Management, according to the bottom-up approach (Berg, 1998; De Vos *et al.*, 2001; Schenk & Grobler, 2009). Research participants will take part in all discussions (Schenk & Grobler, 2009). During the preceding actions, the farmers would have voiced their requirement for a 'telematic centre', which will pose to be the telecentre to be established (phase 2, action 2);
    - An "appropriate and suitable suggestion" will be offered to the research participants in order to "understand how the suggestion could support their needs" (Greenidge, 2004:2; Heeks, 2004:3; USAID, 2004). The outcome of the structured interviews will provide much to be learnt from the farmers. The findings of this socio-economic needs assessment will be discussed with the Management team (Freire, 1994) (phase 2, action 3);
    - All aspects and issues will be approved by the research participants (Schenk & Grobler, 2009). This means that all suggestions, opinions and requests received from the farmers will be incorporated into the decisions made during the four-phase participatory process (throughout the study).
- **Generating technology on the farm and with the farmers**;
    - Appropriate information and communication technologies will be identified in a participatory, emphatic manner with the research participants, recommend Schenk and Grobler (2009) (phase 2, action 4);
    - Guidance and coaching on the new information and communication technologies will be presented to the research participants, as recommended by Colle (2006) – as well as training in the usage thereof, especially for new users, articulate Conradie (1998); Benjamin *et al.* (2000) and Scharffenberger (2001) (phase 3, action 2);
- **Evaluation of technology by adoption or non-adoption**

Each phase will be evaluated formatively, which, according to De Vos *et al.* (1991) entails feedback on the research process. At the end of the project, the summative evaluations

should show whether the technology has been adopted or not - was the appropriate technology identified to fulfil the need? (De Vos *et al.*, 1991) (phase 3, action 3).

4.3.2.4 Alternative types

The type of Andrea Cornwell and Rachel Jewkes (2007) of the University of London, explained in their publication *What is participatory research?* will be integrated with theory in the designing of the generic four-phase participatory process. In applying this type to the study, its four modes of participation will be incorporated:

- **Contractual people** are contracted into the projects of researchers to take part in their enquiries or experiments:
    - The introduction chapter, Chapter 1, described a first small-scale irrigation scheme in South Africa identified by the DWA to be converted to a WUA. This chapter will also show any initiation of the aim of the project as the researcher was, through the ARC, contracted to perform the research.
- **Consultative people** are asked for their opinions and consulted by researchers before interventions are made:
    - The researcher will not only consult the farmers as research participants, but also obtain the opinions of an extensive number of researchers, academics and theorists, in order to obtain a broad background on the agricultural sector of South Africa (throughout the study).
- **Collaborative researchers** and research participants work together on projects designed, initiated and managed by researchers:
    - Collaborative researcher: Dr Jon Rutherfoord of GA, who did the preceding actions and also acted as communicator for the Management Committee during the inception of the project could be seen as a collaborative researcher (throughout the study);
- **Local people:** Conclusions of the structured interviews will be made in collaboration with Management, according to the bottom-up approach (Berg, 1998; De Vos *et al.*, 2001; Schenk & Grobler, 2009); Research participants will be invited to participate in all discussions (Schenk & Grobler, 2009); Freire (1994) suggests that people living in poverty have a culture of silence – they are quiet and passive, and should be urged to convey their perceptions (throughout the study);

- **Collegiate researchers** and research participants work together as colleagues with different skills to offer, in a process of mutual learning where local people have control over the process (throughout the study):
    - Collaboration with the research participants in order that "nothing about us, without us" will be undertaken (Crowder, 1991:92; Colle, 2006).

Rapid Epidemiological Assessment (Selwyn *et. al.,* 1989); Rapid Ethnographic Assessment (Bentley, *et al.,* 1988); early formulations of Rapid Rural Appraisal (RRA); and Rapid Assessment Procedures (RAP) (Scrimshaw & Hurtado, 1987).

To involve the research participants merely as informants is contradictory to the participatory school, chosen for the study. Therefore this type will not be included in the study.

Opposing these viewpoints, is the ethnographic approach with the participatory school, which will be used for the study in order for opinions, feelings, suggestions and proposals of the research participants to be incorporated and integrated in the duration of the four-phase participatory process and to be analysed in the summative evaluation at the end of each phase. With this in mind, the generic four-phase participatory process was created from the theories and types of earlier theorists as well as those more recent (Berg, 1998; Kirsten & Van Zyl, 1998; De Vos et al., 2001; Greenidge, 2004:2; Heeks, 2004:3; USAID, 2004; Van Averbeke, 2006; Schenk & Grobler, 2009) according to which the evaluation of the four-phase participatory process will be undertaken.

Stone (1992)

Although Stone (1992) in support of the participatory research, Stone (1992) is of the opinion that participatory research presents a number of challenges. Applied to the study, these challenges will be integrated with this study as discussed below:

- "Control over the research is rarely devolved completely onto the "community'; nor do 'communities' always want it". The four-phase participatory process will confirm that the community does need the objectives of the study. This is because the farmers have asked for a 'telematic centre' (Perret *et al*., 2003) – which posed to be the telecentre to be established by means of the four-phase participatory process (phase 1, action 1).
- "While many practitioners of participatory research have come to it through ethical unease or plain frustration with the inadequacies of conventional research, participatory research is – What is participatory, research? – certainly not a simpler alternative". With the good rapport to be established between the researcher and the research participants by means of the participatory process, no insufficiencies,

annoyances or disappointments should have to be endured. This will be due to the study executed according to the four-phase participatory process, where, at the end of each phase, with the formative evaluations, the suggestions, demands, ideas and thoughts of the research participants should be discussed in a participatory manner (throughout the study).

- "Working with local people is far from easy. Local people may be highly sceptical as to whether it is worth investing their time and energy in the project, particularly if it seems to offer little in terms of direct benefit. Some researchers have found that the 'communities' they want to involve are apparently uninterested in taking part in research". The bottom-up approach (Berg, 1998; De Vos *et al.*, 2001; Schenk & Grobler, 2009) to be followed through-out the evaluation of the four-phase participatory process should ensure that positive collaboration be created and experienced. Summative evaluations in the last phase of the evaluation of the four-phase participatory process will also prove that the project should be successful, due to the participation and collaboration of the research participants, which should be experienced throughout the four phases of the four-phase participatory process (throughout the study).

4.3.2.5 Extreme project management approach

The Extreme Model with its regular iteration plan and stand-up meetings will be incorporated throughout the participatory project.

This Section identified Actions to be undertaken in a participatory project such as at the small-scale irrigation scheme: Each Phase with its Actions and each Phase with the inclusion of the participatory discussions which led to the PM&E were identified and discussed. The next Section will explain how these actions could be evaluated by means of the Participatory Monitoring and Evaluation Method (PM&E), identified above as the most applicable method to analyse such a participatory project.

4.3.3 Evaluation of the various Actions by means of PM&E:

Phase 1: Pre-establishment phase

- During the feedback session with the Institutional Management to evaluate the success of the application of the preceding research undertaken (Scoones & Cousins, 1989; Chambers & Ghildyal, 1985; Stone, 1992), observation with field-notes will play an important role in the decision-making process regarding whether the preceding research could be used as a platform for further actions, or whether such research should be discarded. This is important, as the preceding research

was undertaken in collaboration with the research participants who will now be involved in this decision-making process (FAO, 2013);

- It is necessary that information from field-notes be analysed at feed-back sessions after each action undertaken (discuss, integrate) (Adams & Garbutt, 2013b) – it is necessary to keep track of information gathered during participatory discussions: During the participatory feedback discussions on the outcome of the agriculture-related needs, participant observation will disclose whether all role-players are satisfied with the agriculture-related needs identified, as it will also include their body language while discussing the outcome, as this covert communication sometimes reveals more responses than the spoken word (Chambers & Ghildyal, 1985; De Vos *et al.* 2001). These field-notes will be important as the needs and the wishes of the beneficiaries will be accepted as the starting point (Berg, 1998; De Vos *et al.*, 2001);
- With the meeting for the explanation of a telecentre and where it would fit into the management of the irrigation scheme, participant observation will play an important role, as it will reveal the real feelings of the farmers in deciding whether they would undertake such a new intervention as a telecentre. It will be, though, of importance to ensure that the Institutional Management understand and are acquainted with the fact that the telecentre belongs to them as spokesperson for the area (Adams & Garbutt, 2013b);
- With the meeting on explaining the relevance of the ICTs to the role-players participant observation with field-notes will play a significant role in the decision-making whether or not to employ ICT at the telecentre. Field-notes analysed by the researcher, will entail the comments and suggestions of the farmers and would reveal their true feelings about these 'machines' of which they would not have had experience before. This is important as it could be referred to at a later stage should another discussion and explanation of the ICT be necessary, as continuous feedback throughout the duration of the process ensures that the quality of the actions is satisfactorily undertaken in order to provide good results (Adams & Garbutt, 2013b).
- During the demonstration of the ICT, these field-notes could serve as a reference to questions previously asked regarding the ICT. It will be of importance to ensure that the Institutional Management understand and are acquainted with the fact that the ICT belongs to the telecentre, regardless who forms the Institutional Management (Adams & Garbutt, 2013b). Discussions in this pre-establishment phase should also include matters on whether the ICT could support the sustainability of the telecentre.

Since Participatory Monitoring provides an on-going picture (World Bank, 2012) that allows the community to determine whether activities are progressing as planned, the researcher will confirm that the research participants understand and comprehend the actions of this phase: By means of participant observation the formative participatory evaluations (Estrella & Gaventa, 1998; Feuerstein, 1986; Estrella, 2000) of the success of the Phase will present a valuable description. Questions to be asked will be formulated in collaboration with the research participants (Coryn, 2011; Russo, 2012) in the decision whether or not to continue with the next Phase.

Phase 2: Preparatory Phase

- Compiling documents such as the Project Plan and how to manage a telecentre will be a new concept to the Institutional Management. Feedback to the Institutional Management on the rough drafts of these documents made by the researcher will indicate whether the Institutional Management is satisfied with the documents in order to finalise the documents. The researcher will ensure that the research participants understand (Adams & Garbutt, 2013b) the content as well as the importance of these documents. Observation with field-notes during participatory discussions will play a key role in the completion of the documents, as it will indicate the suggestions made and questions asked by the role-players, in order for the researcher to address them at a later interview;
- During the structured interviews (Appendix F) with role-players for the identification of socio-economic needs, participant observation will play a crucial role in the comprehension (Adams & Garbutt, 2013b) and completion of the interview schedule – not only because field notes will reveal the true thoughts of the research participants, but also their remarks, questions and suggestions will be noted. This bottom-up approach (Berg, 1998; De Vos *et al.*, 2001) will lead to an indication whether the research participants not only understood the questions, but also regarding their true feelings about employing ICT (Chambers & Ghildyal, 1985) at the intervention;
- During the feedback session where participatory discussions of the findings of the structured interviews with the Institutional Management will be held, participant observation will reveal the exact opinions of the participants regarding the necessity felt by the research participants to employ ICT at the intervention, as observation will indicate not only the questions asked but also suggestions and recommendations made (Chambers & Ghildyal, 1985);
- During the feedback session with the Institutional Management where feedback will be presented regarding the structured interviews, participant observation will present

a thorough picture of the views and opinions of the Institutional Management on the selection of appropriate ICT, with which they will be totally unfamiliar (Chambers & Ghildyal, 1985);

- During the in-depth formative participatory evaluation of the effectiveness of the Phase, participant observation will indicate whether the Institutional Management is satisfied with the outcome of the actions taken, and whether the project could commence to the following phase, as the formative evaluations of the previous Phase will be discussed and integrated. These decisions will be based on the suggestions and proposals of the research participants (Estrella, 2000; Coryn, 2011; FAO, 2013) as the researcher will ensure that the research participants understand the Actions of the Phase.

Phase 3: Establishment Phase

- Participant observation during the purchasing and installation of the appropriate ICT will present an accurate picture of the real impressions and suspicions of the role-players regarding the new ICT. As the ICT will be a totally new concept to the Institutional Management, field-notes will be taken in order to discuss any negativity observed during the installation, to be addressed at a later feedback session. This is necessary, as Participatory Monitoring provides an early warning which identifies problems at an early stage (Krishnaswamy, 2015);
- Participant observation with field-notes will play an essential role during the training of key-personnel in the usage of ICT. All questions, problems, suggestions and feelings towards the ICT noted in the field-notes could be addressed as the training sessions progressed (Chambers & Ghildyal, 1985).

During the formative participatory evaluation of the effectiveness of the intervention through the establishment of a telecentre, participant observation will reveal whether there are any unresolved questions for problems which have not been addressed (Chambers & Ghildyal, 1985). By including and discussing formative evaluations of the previous Phases, participatory discussions will result in the researcher accepting that the research participants understand the Actions of the Phase, as a consecutive Phase of the previous Phases in the participatory process.

Phase 4: Participatory Evaluation Phase

- During the meeting where all the formative evaluations of all the phases are merged, participant observation will play a crucial role, since here it could be identified whether the Institutional Management is satisfied with the complete participatory project.

- The meeting on the summative evaluation of the effectiveness of the intervention will be supported by participant observations with field-notes. The participant observations with field-notes will be essential, as the end of the participatory project will be reached, and there might still be unresolved problems, suggestions not attended to or needs not addressed which will be discussed at additional in-depth interviews. The conclusions drawn will be based on the suggestions and proposals of the research participants (Estrella, 2000; Coryn, 2011; FAO, 2013).
- Quantitative data collection: The first questionnaire on measuring the operation of the ICT will be regarding the usage of the ICT and will indicate whether the ICT is used optimally (Appendix M). The second questionnaire will evaluate how many calls were made during one month with answers regarding approximately how many users used the phone for incoming as well as outgoing calls per month (Cohen *et al.,* 2000; Lakoff, 1990) (Appendix N).

This Sub-section identified from Section I, the project Phases that would be most appropriate for the project framework of a small-scale project (Section 4.3.1) as well as the Actions (Section 4.3.2) to be undertaken within each of these participatory project Phases. Each Phase has its own Actions, with the importance of PM&E specifically and prominently mentioned to be undertaken during each of these Phases. In the second part of Section II (Section 4.3.3) it was described how the Actions identified as required for small-scale participatory project planning, design and research (evaluation), could be evaluated according to the PM&E as identified in Section I. During these PM&Es, data will be collected by means of the data collection methods identified in Section 4.2.5.

To follow is SECTION III which will explore how the literature from the above two SECTIONS could be applied and used in order to create a generic four-phase participatory process. The aim of the generic model is to serve as basis that could be applied for the establishment and evaluation of institutions such as a telecentre, a cooperation, a Trust and a Community Development Programme.

SECTION III

Section III will explain how a generic four-phase participatory process could be created and evaluated – how the literature could be applied to the creation of a process for the establishment and evaluation of a telecentre with specific reference to the agricultural sector. In the following Sections, the methods, procedures and techniques described in Section II will be applied to the design of a participatory research process: The research process will entail a project design (four phases are selected for this project and will forthwith be referred

to as the Four-Phase Participatory Process), as well as the actions within each project phase of which the formative evaluation (PM&E Method) forms a part.

In this Section it is shown how these instruments could be applied with special reference to the applicability, the relevance and the suitability thereof for the evaluation of a rural-agriculture related telecentre project:

- **Regarding the framework:** The incorporation of preceding suggestions from Farmers (Chambers & Ghildyal, 1985; Cornwell & Jewkes, 2007); Agile project (TutorialsPoint, 2015) which stresses the human interaction management; and the Extreme Programming (XP) (xPM, 2015) regarding the importance of feedback.
- **Regarding the actions:** From Scoones and Cousins and the Alternative Model: Farmer-First-and-Last (Chambers & Ghildyal, 1985) that the ideas, opinions and viewpoints of the role-players should be incorporated during their research; from the Transfer-of-Technology Model (Chambers & Ghildyal, 1985) the value of taking preceding actions into consideration as well as the importance of formative evaluations during the process; and addressing the needs, problems and opportunities of the farmers from Stone (1992).

This resulted in a summarised diagram of a generic Four-Phase Participatory Process. This generic four-phase participatory schema could be applied to the establishment of a telecentre, a Trust, a Cooperative or a Community Development Programme.

The following is a visual diagram of a generic four-phase participatory process, constructed and composed from theories from the above Sections:

Figure 4.5: Generic four-phase participatory process

PHASE 1: PRE-ESTABLISHMENT PHASE

In this phase the following actions should be taken:

- Studying the physical and emotional world through a participatory farming needs assessment including analysing preceding research undertaken in the location to be researched (Scoones & Cousins, 1989; Chambers & Ghildyal, 1985; Stone, 1992).
- Analysing the physical and emotional world by analysing outcome of the agriculture-related needs in collaboration with all role-players (Chambers & Ghildyal, 1985; De Vos *et al.* 2001).
- Develop a solution for the physical and emotional world through the application of findings of the analysis to the concept of a telecentre.
- Proposal for the physical world through explaining of the relevance of the ICTs to the role players.
- Formative evaluation of the effectiveness of the intervention.

Data collection methods: feedback sessions; participatory observation with field-notes.

PHASE 2: PREPARATORY PHASE

In this phase the following actions should be taken:

- Considering the emotional world by developing an establishment plan in collaboration with role players.
- Analysing the emotional world (socio-economic and ICT needs) through structured interviews with role players (Chambers & Ghildyal, 1985).
- Studying the outcome of the emotional world through participatory discussions of findings with Institutional Management (Chambers & Ghildyal, 1985).
- Facilitate physical world through selection of appropriate ICT (Chambers & Ghildyal, 1985).
- Iterative formative evaluation of the effectiveness of the intervention, including those of Phase 1

Data collection methods: Feedback session; structured interviews; participatory observation with field-notes.

PHASE 3: ESTABLISHMENT PHASE

In this phase the following actions should be taken:

- Ease of physical world through the acquisition and installation of the appropriate ICT.
- Ease of the emotional world by training of key-personnel in the usage of ICT (Chambers & Ghildyal, 1985).
- Iterative formative evaluation of the effectiveness of the intervention through the establishment of a telecentre (Chambers & Ghildyal, 1985), including those of former Phases

Data collection methods: Feedback sessions; training sessions; participatory observation with field-notes.

PHASE 4: PARTICIPATORY EVALUATION PHASE

- Merging the formative evaluations of all Phases
- Summative evaluation of the effectiveness of the intervention through the establishment of a telecentre in participatory discussions with Management.
- Quantitative evaluation: Questionnaires

Data collection methods: Participatory discussions with participatory observations and field-notes.

(Source: Researcher's compilation from literature, in collaboration with role-players)

4.4 OVERVIEW OF THE GENERIC FOUR-PHASE PARTICIPATORY PROCESS

In the previous Section, a generic four-phase participatory process for the establishment and the evaluation of a telecentre in the agricultural sector was formulated, created and explained. In this Section an explanation of the application of the four Phases of the generic four-phase participatory process is presented.

Phase 1, the Pre-establishment Phase, is necessary to incorporate all preceding actions and research that could have been undertaken at the community to be developed. It is also necessary to discuss the intervention with the role-players, in order to identify whether they agree or not, with the intervention. Formative evaluations (PM&E) would identify whether all the Actions were successful and whether the process could progress to the next Phase.

Phase 2, the Preparatory Phase, is necessary in order to discuss and compile various documents (Project Plan and 'how to manage a telecentre'). The socio-economic needs should be identified. Previous usage of the ICT to be installed in the telecentre should be verified. Formative evaluations (PM&E) would identify whether all the Actions were successful and whether the process could progress to the next Phase. This will also include retrospective discussions regarding the outcome of formative evaluations in the previous Phase in order to ensure that objectives of the participatory project are addressed.

Phase 3, the Establishment Phase, is where all the above actions are integrated and concluded in the actual establishment of the undertaking. Formative evaluations (PM&E) will identify whether all the Actions were successful and whether the process could progress to the next Phase. This will also include retrospective discussions regarding the outcome of formative evaluations in the previous Phases in order to ensure that objectives of the participatory project are addressed.

Phase 4, the Participatory Evaluation Phase, will merge the formative evaluations of all the previous Actions undertaken during the first three Phases in order to conclude whether all the Actions were finalised successfully. The summative evaluation, the end-project evaluation, will conclude whether the intervention was successfully undertaken.

This Section presented an overview and short description of the importance of each of the various four Phases of the generic four-phase participatory process created for the establishment and evaluation of an agricultural telecentre. The next Section will explain how these four Phases could be applied to four generic Phases of a participatory project in practice.

4.5 APPLICATION OF THE GENERIC FOUR-PHASE PARTICIPATORY PROCESS TO A PARTICIPATORY TELECENTRE PROJECT

This Section will explain how the generic Four-Phase Participatory Process could be applied to a rural agricultural project.

4.5.1 PHASE 1: PRE-ESTABLISHMENT PHASE

- Studying the physical and emotional world: A thorough study of preceding or prior research – the identification of practical basic needs (Van Averbeke, 2006) – which could have been undertaken with the research participants and their environment should be undertaken. (Cornwell & Jewkes, 2007). To incorporate preceding suggestions from farmers means to learn from farmers as consultative peoples (Chambers & Ghildyal, 1985; Cornwell & Jewkes, 2007). This could present valuable information regarding the communication needs, as background to the study.
- Analysing the physical and emotional world: The agriculture-related information needs concluded from the communication needs, such as a need for water (Scoones & Cousins, 1989) in a water scarce country such as South Africa, of the farmers (Cornwell & Jewkes, 2007) should be researched in the agricultural sector. Noting that the South African agricultural telecentre differs vastly from the universal telecentres found in literature, due to the special and different agricultural environment (Kirsten & Van Zyl, 1998; Van Averbeke, 2006) an accurate view of the characteristics of the South African agricultural sector should be created;
- Develop a solution for the physical and emotional world: Since the Management Committee (representing the community) will have no knowledge of either the Internet or information and communication technologies, conclusions of the structured interviews should be drawn in collaboration with them as collaborative participants (Cornwell & Jewkes, 2007; Coryn, 2011; Russo, 2012). The concept of a telecentre should be explained according to the bottom-up approach advocated by Berg (1998), De Vos *et al*. (2001) as well as Schenk and Grobler (2009) and Russo (2012). Research participants should be invited to participate in all discussions, as suggested by Schenk and Grobler (2009);
- Proposals for the physical and emotional world: An “appropriate and suitable suggestion” should be offered to the research participants (Cornwell & Jewkes, 2007) in order to “understand how the suggestion could support their needs” (Greenidge, 2004:2; Heeks, 2004:3; USAID, 2004) – the concept of the information and communication technologies should be explained to the research participants as

collaborative participants (Cornwell & Jewkes, 2007; Adams & Garbutt, 2013b), in order to present a picture of what the information and communication technologies would entail (De Vos *et al*., 2001);

- Formative PM&E, according to the theories of Guijt (1998) and Estrella (2000) should be undertaken in a multicultural dialogue (Schenk & Grobler, 2009) with the Management Committee (Adams & Garbutt, 2013b). Schenk and Grobler (2009) add that personal conversations should be conducted on an individual basis.

4.5.2 PHASE 2: PREPARATORY PHASE

- Considering the emotional world: All documentation should be approved by the research participants (Cornwell & Jewkes, 2007). Schenk and Grobler (2009) propose that empathy means that the facilitator listens well and tests what he/she has assumed and understood, with the research participants (Chambers & Ghildyal, 1985). Gomez *et al*. (2001b) refer to these aspects as effective instruments to understand the needs of the community;

- Analysing the emotional world: Socio-economic and ICT needs of research participants (farmers) should be determined, as they would differ from those of farmers at commercial or universal farming communities (Lahiff, 2000; Shah *et al*., 2002). It is therefore important not only to take the conceptions and concerns of the farmers as research participants into consideration, but also to discuss and negotiate these outcomes with the research participants (Chambers & Ghildyal, 1985; Adams & Garbutt, 2013b).

- Studying the outcome of the emotional world: The findings on the socio-economic and ICT needs (Chambers & Ghildyal, 1985) should be discussed with the Management Committee (Adams & Garbutt, 2013b) in order to obtain their suggestions and feelings about the outcome of the findings, as Freire (1994) suggests that people living in poverty have a culture of silence – they should be urged and supported to convey their perceptions;

- Facilitate physical world: Appropriate ICT, as recommended during the discussion on the findings of the socio-economic and ICT needs assessment, should be identified and selected in collaboration with the Management Committee (Adams & Garbutt, 2013b);

- Formative PM&E, according to the theories of Guijt (1998) and Estrella (2000) should be undertaken in any multicultural dialogue (Schenk & Grobler, 2009). Schenk and Grobler (2009) add that personal conversations on an individual basis should be

conducted with the Management Committee (World Bank, 2012; Adams & Garbutt, 2013b).

4.5.3 PHASE 3: ESTABLISHMENT PHASE

- Ease of physical world: Appropriate ICT, applicable to the circumstances of the research participants (Chambers & Ghildyal, 1985) should be obtained (Chambers & Ghildyal, 1985) – in a participatory, emphatic manner with the research participants, recommend Schenk and Grobler (2009), agreeing with Crowder and Colle, who suggest that "nothing about us, without us" will be undertaken (Crowder, 1991:92; Colle, 2006);
- Ease emotional world: Guidance, training and tutoring (Chambers & Ghildyal, 1985) in the usage of the new ICT, should be presented to the research participants (Adams & Garbutt, 2013b), as recommended by Colle (2006) – especially for new users, as articulated by Conradie (1998); Benjamin *et al.* (2000) and Scharffenberger (2001);
- Formative PM&E, according to the theories (Estrella & Gaventa, 1998; Feuerstein, 1986; Estrella, 2000) should be undertaken in this cross-cultural dialogue, as the research participants will understand this new information from their own context (Schenk & Grobler, 2009), as discussed with the Management Committee (Adams & Garbutt, 2013b).

4.5.4 PHASE 4: PARTICIPATORY EVALUATION PHASE

The Participatory Monitoring and Evaluation Method is chosen for this study, as it provides an on-going picture (Berg, 1998; De Vos *et al.*, 2001) through-out the various phases of the four-phase participatory process in order for problems to be identified and solutions sought early. Thereby good standards are maintained by continuous feedback (Feuerstein, 1968; Estrella, 2000; Coryn, 2011). Since resources are used effectively, a complete picture of the four-phase participatory process is produced whereby information forms a basis for future evaluations.

These evaluations are categorised as follows:

- **Formative evaluations**, performed at the end of each phase, are merged into a résumé of all the formative evaluations throughout the Phases – each phase should have been evaluated, which, according to Feuerstein (1968), De Vos *et al.* (2001) and the World Bank (2012) entails feedback on each Action undertaken. Formative evaluation is undertaken during the development of a community and it may be conducted by an in-house or an external researcher (Weston *et al.*, 1995) and should

be discussed with the research participants throughout the participatory process (Chambers & Ghildyal, 1985; De Vos *et al.,* 2001; Adams & Garbutt, 2013b). Formative evaluation would include the following aspects:

- Were the research participants (FAO, 2013; Coady International Institute, 2014) involved in all decision-making processes because their needs and suggestions are important? (IDRC, 2007a; Coryn, 2011). Were the research participants trained and guided in their new circumstances?
- Was the methodology used during the research methodology appropriate and relevant to the study? (IDRC, 2007b).
- What was the influence of the environment on the project? (Mikkelsen, 1995; Berg, 1998; Coryn, 2011).
- According to various researchers (Stoll, 2006; Colle, 2006; Fundacion Chasquinet, 2006; McConnell, 2007) the sustainability of a project depends on a number of aspects of sustainability.

- **Summative evaluation** undertaken by means of assessing the degree, amount and extent of the newly introduced circumstances and conditions:
  - Product evaluation (Coady International Institute, 2014), which refers to the expected outputs of the project, i.e. to what degree have of the research participants accepted, implemented and adopted the technologies? (Chambers & Ghildyal, 1985; Jones, 2011). What are the uses, benefits and impacts of these products regarding project objectives? (Feuerstein, 1986).
  - Process evaluation, which refers to how the project was implemented (Coady International Institute, 2014), i.e. to assess whether the approach and work-plan (Feuerstein, 1968) were implemented as foreseen or why changes were made as well as lessons learnt for the establishment and operation of a telecentre (Jones, 2011).

This Section (Section 4.4) explained how the various theories were incorporated in the study in order to create a framework (four participatory phases) (Section 4.4.1) as well as the various Actions (Section 4.4.2) to be undertaken in these four participatory phases resulting in a visual model for the generic four-phase participatory process in Figure 4.5. A discussion followed on how this generic Four-Phase Participatory Process could be applied in practice: To the establishment and evaluation of a participatory agricultural telecentre project (Section 4.5).

4.6 SUMMARY

The three Sections described the creation, application and evaluation of a generic Four-phase Participatory Process, which could be applied to the establishment of a telecentre, a Trust, a Cooperation or a Community Development Programme.

Section I reviewed literature (Section 4.2.1) on project planning and design (Section 4.2.2) as well as literature on planning and design of project actions that rely on participatory processes to be followed (Section 4.2.3). The last part of Section I included a literature review of participatory evaluations, leading to the PM&E Method (Section 4.2.4) which forms part of the processes (actions) followed during a participatory project. Data collection methods (Section 4.2.5), sample design (Section 4.2.6) and data analysis (4.2.7) for a participatory project are identified and discussed.

Section II identified from Section I, the project phases that will be most appropriate for the project framework of a small-scale project like the telecentre (Section 4.3.1). In the second part of Section II, an evaluation of the actions identified in Section I was done and the actions required for small-scale participatory project planning, design and research (evaluation), were identified (Section 4.3.2).

Section III started with the design of a generic project framework that includes project phases from the planning through to the post-execution phase. This Section (Section 4.4) explained how the various theories were incorporated in the study in order to create a framework (four participatory phases) (Section 4.4.1) as well as the various actions (Section 4.4.2) to be undertaken in these four participatory phases (resulting in a visual model for the generic four-phase participatory process in Figure 4.5). An overview of the generic Four-Phase Participatory Process was presented in Section 4.5. A discussion followed on how this generic Four-Phase Participatory Process could be applied to a participatory telecentre project in Section 4.6.

The following Chapters will present the unfolding and evolving of the small-scale participatory project as applied to the Thabina irrigation scheme – the Chapters corresponding to the various phases are indicated in this Chapter. For convenience, a time-line will be included in each Chapter, constantly reminding the reader of how the project evolved. Each Chapter will present and explain the evaluation of the actions of the specific phase undertaken in order to evaluate the phase and determine whether the various actions did lead to the objective of the small-scale participatory project, namely the successful establishment of a telecentre at the Thabina irrigation scheme.

CHAPTER 5 – PRE-ESTABLISHMENT PHASE

5.1 INTRODUCTION

The previous Chapter developed a generic framework for the research, establishment and evaluation of a rural agricultural telecentre. The following Chapters – Chapter 5 to Chapter 8 will explain the application and evolving of this four-phase participatory process on the actual implementation and evaluation of the telecentre at the Thabina irrigation scheme.

Regarding planning and development, the Thabina telecentre was established according to an innovative and cutting-edge four-phase participatory process, developed and created by meticulously studying the work of theorists and academics (Chapter 4) as well as regarding profound lessons learned through practical experience by practitioners and researchers. This four-phase participatory process was adapted from the generic four-phase participatory process (Chapter 4) to fit, relate and suit the special and unique circumstances of the farmers of the Thabina irrigation scheme. This four-phase participatory process can also be adapted for the establishment of a Trust, a Cooperation or any Community Development Programme. Regarding the unfolding of the project, and contradictory and differing from other telecentres which are established as 'boxes from the sky' due to the fact that no needs assessments are undertaken before-hand (Chapter 3) the outcome of preceding research was investigated and applied in this Chapter.

This Chapter concerns itself only with Phase I (also referred to as the Pre-establishment Phase) of this project framework with a discussion on preceding Actions which had to be undertaken with special reference to the identification of agriculture-related information needs and the participatory discussions on the concept of a telecentre and information and communication technologies.

In this Chapter, the issues which will be dealt with consequently are the following: Firstly, a description of the actions identified in Chapter 4 as they were applied at the Thabina Telecentre will follow resulting in a time-line according to which these actions were undertaken (Section 5.2). Section 5.3 will present the background to the various Actions of the four-phase participatory process, with specific reference to the Actions of Phase 1, as explained in this Chapter. Section 5.4 will describe the actions taken towards the establishment of a telecentre, with Section 5.4.1 explaining the preceding actions of Phase 1, Action 1. With the preceding actions explained, Section 5.5, with the unfolding of Phase 1, will describe the identification of the agriculture-related needs in table format. Section 5.6 will discuss the agricultural needs as explained and described to the Management Committee. Section 5.8 will deal with the demonstration of the information and communication technologies. Section 5.9 will present PM&E with results, criteria and

research methods of the various actions undertaken Section 5.10 is the summary of the chapter.

Before this Chapter on the Actions and the evaluation of the Pre-establishment Phase can commence, it is necessary to present a background of how this Phase will proceed, develop and evolve. These aspects, such as the aim, the uniqueness, the incorporation of preceding Actions as well as the importance of the needs assessment during the participatory project, will be briefly explained in the next Section.

5.2 BACKGROUND ON HOW PHASE 1 PROCEEDED

The aim of the research into the Thabina irrigation scheme was to produce guidelines for the introduction of information and communication technologies into a rural agricultural community at a small-scale irrigation scheme in South Africa by means of a telecentre, which would make applicable, germane and relevant communication available to the research participants in order to address their identified needs. The study is unique as it was undertaken at the first small-scale irrigation scheme in South Africa identified by the Department of Water Affairs to be transferred into a WUA, as specified by the National Water Act (Act 36 of 1998) (NWA), introduced in October 1998.

The research is also unique to South Africa, as the then existing telecentres had failed due to the fact that no preproduction research participant research had been undertaken before these telecentres were established, as donors would address only those needs which they perceived as important. The fact that no preceding research had been undertaken at the telecentres led to the assumption that the lack of an accurate needs analysis is now regarded as an important reason for the failure of most telecentres, as they are implemented as 'boxes from the sky'. The authenticated needs of the specific community are not identified and analysed, and neither taken into consideration nor communicated to the specific community. This means that the needs of the community should be identified in order to ascertain which information and communication technologies would be appropriate to address these identified needs. The defined needs of the communities are not addressed by current telecentre initiatives.

Because this research, as explained in the previous chapter, was undertaken according to the participative research approach, it meant that the culture of the rural agricultural community of Thabina formed a central part of the preparation of Phase 1. The culture of the agricultural community of Thabina, such as language and literacy, was investigated and formed the basis of all participatory discussions of Phase 1. The previously identified communication needs, the NPFA, revised and categorised into the agriculture-related needs of the community of Thabina, played an important role in the study: The information and

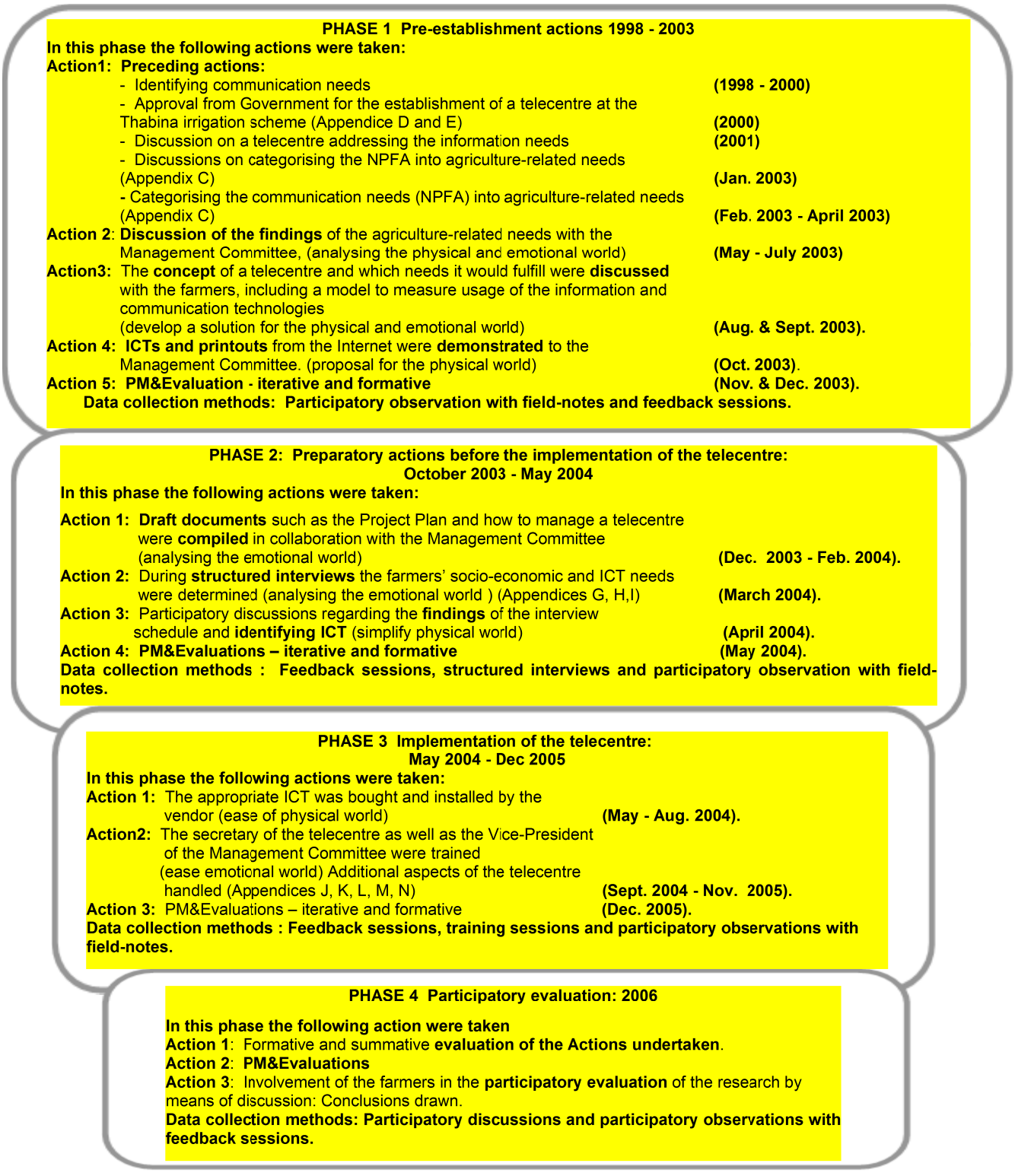
communication technologies identified to address these agriculture-related needs would later be compared to those appropriate for also addressing the socio-economic and ICT needs, to be identified in the following Phase (Section 6.3), in order to identify the applicable information and communication technologies to be bought. The two analyses were important as these small-scale farmers did not have the funds to buy any information and communication technologies and they had to rely on donors. Therefore also refer to the Section on a telecentre without Internet. The research was participatory, using the methods of participant observation while interacting with the various stakeholders during the feedback sessions.

Section 5.2 presented the background of the Pre-establishment Phase: How the various Actions of Phase 1 proceeded. After the explanation of how the Phase proceeded and developed, it is necessary to explain the framework (four phases) and the various Actions as concluded from the generic four-phase participatory process that will be undertaken during this participatory study. The evolving, developing and evaluation by means of PM&E of the participatory project will consequently be presented in a visual diagram of the four-phase participatory process presented in the next Section. This will be followed by the discussion which will be narrowed down to the Pre-establishment Actions, undertaken for the establishment and evaluation of the Thabina telecentre project. Before a discussion of the various Actions undertaken, a visual diagram with a time-line for each Action undertaken will be presented. A discussion on the various Actions, which each played a role in the decision-making process of establishing a telecentre, is presented in the next Section.

5.3 TIME-LINE FOR THE ACTIONS OF THE PRE-ESTABLISHMENT PHASE AND EVALUATION THEREOF

Description of the actions identified in Chapter 4 as they were applied at the Thabina Telecentre.

Figure 5.1: Four-phase participatory process, adapting the generic model and explaining the various steps in the process of the study



Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

With the complete four-phase participatory process presented in the visual diagram above, the participatory study focuses on the Actions to be undertaken in the Pre-establishment Phase – the first phase of the four-phase participatory process. The Actions of this Phase as it was adapted from the generic actions and applied to the Thabina project, including the detailed time-line, are presented in the diagram below.

Figure 5.2. Phase 1: Timeline of the actions

PHASE 1 Pre-establishment actions 1998 – 2003

In this phase the following actions were taken:

Action1: Preceding actions:

- Identifying communication needs **(1998 - 2000)**
- Approval from Government for the establishment of a telecentre at the Thabina irrigation scheme **(2000)**
- Discussion on a telecentre addressing the information needs **(2001)**
- Discussions on categorising the NPFA into agriculture-related needs (Appendix C) **(Jan. 2003)**
- Categorising the communication needs (NPFA) into agriculture-related needs (Appendix C) **(Feb. 2003 - April 2003)**

Action 2: **Discussion of the findings** of the agriculture-related needs with the Management Committee, (analysing the physical and emotional world) **(May - July 2003)**

Action3: The **concept** of a telecentre and which needs it would fulfil were **discussed** with the farmers, including a model to measure usage of the information and communication technologies (develop a solution for the physical and emotional world) **(Aug. & Sept. 2003).**

Action 4: ICTs and printouts from the Internet were **demonstrated** to the Management Committee. (proposal for the physical world) **(Oct. 2003)**.

Action 5: PM&E valuation (iterative and formative) (Nov. & Dec. 2003).

Data collection methods: Participatory observation with field-notes and feedback sessions.

Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

Section 5.1 explained the Actions of this Phase as it was adapted from the generic actions and applied to the Thabina project, with a diagram presenting the time-line of the various Actions undertaken. The next Section will present the background of the Pre-establishment Phase: How the various Actions of Phase 1 proceeded.

5.4 ACTIONS UNDERTAKEN IN PHASE 1

Before the Pre-establishment Actions could be discussed, it is necessary that the various participatory meetings and discussions held as well as the Actions which had to be taken before the pre-establishment actions could be undertaken, be explained. These preceding Actions are described below.

5.4.1 Preceding actions undertaken: Phase 1, Action 1

The next Section forms Section 1 of Part 1 of Action 1.

5.4.1.1 Identifying the communication needs of the farmers undertaken by Dr. Jon Rutherfoord of a consulting company: 1998 - 2000

During 1998 to 2000, Dr. Jon Rutherfoord of a consulting company assessed the circumstances of the Thabina irrigation scheme. This was undertaken because the Thabina

irrigation scheme was in the process of being converted into a water user association (WUA) – all irrigation schemes and irrigation boards had to be converted to WUAs according to this new Act, NWA, as explained above. Rutherfoord (1998) used a questionnaire (Appendix B) and also identified the needs, problems, fears and aspirations (NPFA) (Appendix C) of the farmers, which would be converted into agriculture-related information needs (Section 5.5) through the required participatory processes with the researcher, the Management Committee (community) and the additional role-players.

5.4.1.2 Obtaining approval from government for the establishment of a telecentre at Thabina irrigation scheme, undertaken by the researcher with role-players: 2000

The interest in this research started when the researcher was employed by the Agricultural Research Council (ARC), Institute for Agricultural Engineering. During a workshop with the HSRC, the researcher learned about the phenomenon of a telecentre based on information and communication technologies. The Engineers of the Institute for Agricultural Engineering were involved with the upgrading of the Thabina irrigation scheme in collaboration with the NPDALE, then Northern Province Department of Agriculture, currently the Limpopo Department of Agriculture (LDA). During a meeting of the Engineers and the researcher with the Management Committee at Thabina, it became evident that the farmers at Thabina had to communicate with other agriculture-related organisations such as the DWA, Cooperatives, etc. The researcher mentioned the option of an intervention such as a telecentre. The meeting decided that the consent of then Director of the Policy and Planning Unit of the Northern Province Department of Agriculture, further referred to as the 'Director of NPDALE', should be obtained before any actions would be undertaken. It was important to obtain the consent of the Director of NPDALE, because the water distribution infrastructure, in this case a weir and a 5 km canal, was owned and managed by the LDA.

The researcher introduced the Director of NPDALE to the manager of MACIS (a telecentre in Mamelodi near Pretoria) who explained to him how a telecentre was operated. The Director of NPDALE gave his consent to continue with the establishment of a telecentre at Thabina.

The Director of NPDALE discussed the matter of the telecentre at Thabina irrigation scheme with the ADG from the Office of the Director General of the National Department of Agriculture, who gave his approval and even suggested funding of the project in his report (Appendix D). This led to the approval of funds of R63 000 for the travelling and accommodation costs of the researcher for the execution of this project – which proved to be the only funds to be obtained from government (no funds were obtained for the establishment, running and management of the telecentre).

The Director of NPDALE also informed the researcher by telephone that he briefly discussed and explained his approval regarding a telecentre at the Thabina irrigation scheme with the Management Committee, which led to the researcher receiving a letter of consent from the Management Committee explaining that they do want an information centre at their irrigation scheme (Appendix E).

After approval had been obtained to establish a telecentre at the Thabina irrigation scheme, further actions regarding the establishment could be undertaken. The next Section will present an overview of discussions held by role-players regarding the future of the newly established WUA.

5.4.1.3 Discussions regarding whether a telecentre could address the information needs of the farmers of the Thabina irrigation scheme, undertaken by the researcher with role-players: 2001

In January 2001, the Agricultural Research Council (ARC) had a meeting with the Management Committee of the Thabina irrigation scheme. The aim of the meeting was to discuss the newly established WUA with the Management Committee of the Thabina WUA. The Management Committee comprised of nine members.

During the meeting it became evident that the Management Committee needed to communicate with other WUAs as well as with agriculture-related organisations such as the Department of Agriculture, Forestry and Fisheries (DAFF), the ARC and the Limpopo Department of Agriculture (LDA), as well as farming institutions including cooperatives, markets, and weather institutions. There were also various rules and regulations (regarding the National Water Act) from the DWA to adhere to. For these calculations, communications and correspondence, the Management Committee of the Thabina Irrigation Scheme would require applicable technologies. The researcher briefly explained the concept of the information and communication technologies and the telecentre to the Management Committee, who agreed that the meeting should analyse how these information and communication technologies could address their needs, as well as to arrange a demonstration of these information and communication technologies at a later stage (Establishment Phase). The Chairman also had a personal computer at home and explained to the meeting the operation thereof and what his computer enabled him to do. The meeting was satisfied that the information and communication technologies could enable them to communicate with various departments and agriculture-related institutions and agencies. This demonstration will be described and explained in this Chapter 5 in Section 5.5, Action 2.

The Management Committee, having learnt about the information and communication technologies, also concluded that the farmers needed to improve their financial management system to deal with monthly levies. They also needed to update bookkeeping and reporting to the Management Committee, which was done manually and led to various errors. For these calculations they would not only need the computer programme MSExcel but also needed to know how to operate it.

Dr. Rutherfoord (1998) as spokesperson for the Management Committee, also reminded the meeting that in his previous research at Thabina, the needs of the farmers, identified as the needs, problems, fears and aspirations (NPFA) (Appendix C) had been identified. Dr. Rutherfoord briefly explained what it entailed and immediately the Management Committee asked several questions such as: “What is that?”; “What can we do about it?”; “How can we solve these problems?”; “Who can help us to solve these problems?”; “When can we solve these problems?” After Dr. Rutherfoord had addressed all questions and uncertainties, the meeting agreed that this NPFA has not changed over the years. During these participatory discussions Dr. Rutherfoord agreed and gave his consent to use this NPFA for the project and all role-players agreed that the NPFA would merely be used as a starting point for the project. The NPFA was unanimously adopted by the participants as a basis for identifying the agriculture-related information needs. It is important to note that the First Phase of the Generic Model, Figure 4.5 in SECTION III, in the previous Chapter, Chapter 4, makes special reference and suggestions to include the analysing of preceding research undertaken in the location to be researched. When the researcher explained that this NPFA could be refined into agriculture-related information and communication needs of the farmers, all role-players agreed.

The researcher explained the concept of a telecentre, based on information and communication technologies, which could be a new intervention in order to address these agriculture-related needs. The establishment of a telecentre was discussed and all attendees raised their questions and expressed their contributions such as: “We must first identify and address our agriculture-related needs”; “Who will help us to operate these machines?”; “What are the socio-economic and ICT needs?”; “What are these ICT machines?”; “Who will attend the survey, because we must irrigate early?” This process ensured that the communication between the researcher, the Management Committee as well as with the farmers was interactive and participatory. During these discussions on the topic to investigate the possibility of a telecentre, good rapport had been established among the role-players. The researcher played the role of the facilitator.

The next Section forms Part 2 of Action 1 where the role-players decided to categorise the NPFA in order to make it practical as well as compatible to the new information needs of the farmers with the establishment of a WUA at the Thabina irrigation scheme.

5.4.1.4 Discussions on categorising the NPFA for the identification of agriculture-related needs, undertaken by the researcher with role-players: 2003

All role-players had previously (Section 5.4.1.2) decided that the NPFA should be used in the determination of the agriculture-related information and communication needs of the local community. The Management Committee, a Senior Official from the DWA, a renowned Civil Engineer in the agricultural sector and the Chief Specialist Engineer from the Department of Water Affairs, (DWA) who contributed a prominent role in drafting the NWA and the researcher were requested to categorise these NPFA into:

- Infrastructure and land issues;
- Service issues; and
- General issues.

During the feedback session, the discussion of each category during the participatory process was discussed in detail with the role-players to accommodate their questions, ideas and knowledge.

This Section explained the various discussions, negotiations and considerations undertaken regarding preceding research undertaken at the Thabina irrigation scheme. This exercise above completed Part 1 of Action 1, where all preceding actions which had to be taken in order to position the study, were explained. After presenting these conclusions, the research participants agreed that the participatory project could proceed to the next Action, Part 2. Part 2 of Action 1 consisted of the practical categorising of the NPFA into agriculture-related information and communication needs which will be discussed in the next Section.

5.5 AGRICULTURE-RELATED INFORMATION NEEDS IDENTIFIED, CONCLUDED FROM THE NPFA, undertaken by the researcher with role-players. Action 1 Part 2: May and June 2003

This Section forms Part 2 of Action 1, where the NPFA are converted into agriculture-related information and communication needs, each with its own information source, information need and information and communication technology to address the specific information need.

During discussions of the NPFA, in February to April in 2003, all role-players decided that this NPFA should be examined and analysed in order to identify and describe the

agriculture-related needs of the community of Thabina, concluded from the NPFA. The role-players agreed that the researcher would analyse these NPFA. All aspects of the identified NPFA were agriculture-related. These needs and information might seem very simplistic, but these solutions had to be described and explained to the farmers in a manner that the farmers would understand.

As preceding actions, the NPFA (Appendix C) was categorised into agriculture-related information and communication needs in collaboration with the Management Committee, the Extension Officer and a Senior Official from the DWA, during May to June in 2003. It was necessary to identify the agriculture-related information and communication needs in order to identify the information and communication technologies to address these information needs, as the aim of the telecentre would be for the farmers to be able to receive information and communicate with DWA and other agricultural departments and institutions. This is in order to adhere to various rules and regulations stipulated in the National Water Act (Act 36 of 1998) (NWA). It took two months to categorise these NPFA. These NPFA were categorised into agriculture-related information and communication needs – each with its information source. This makes the Thabina telecentre unique due to the fact that the environment of Thabina differs vastly from that of the international telecentres which means that the NPFA at Thabina would also differ from international irrigation schemes. This is also the first contribution to the establishment of a telecentre where the information and communication needs are converted from agriculture-related needs each with its own information source. These sections with the information and communication technology to address the specific needs, are presented in Tables 5.1 to 5.17 below.

The first four columns of the tables reflect the information and communication needs - problems, fears, aspirations and needs respectively of the farmers, as revealed in the NPFA. Every problem entailed its own fear, aspiration and/or need (emotional world). The fifth column shows the agriculture-related needs (physical world). Next to the agriculture-related needs, the information source that can address the specific information and communication need is followed by the suggested information and communication technologies to allow for this communication to take place. Although the basic communication sources are the farmers themselves by word of mouth, as well as the Extension Officers, sources (information and communication technologies) that could be provided by a telecentre were identified: Various meetings were held to construct these tables during this time-frame, with the following contributions by the experts on the various aspects identified in the tables:

- The Extension Officer assisted the Management Committee who provided the most contributions regarding the identification of the agriculture-related needs from the

NPFA. The Management Committee fully comprehended the extent of the NPFA, as this was the major dilemma of the farmers at that stage;

- With assistance of the other role-players, a Senior Official from the DWA provided the identification of the information sources available to the farmers. This was because the Official from the DWA, as a Civil engineer, had experience in the agricultural water sector since 1971. During these participatory discussions he was employed by the DWAF as Chief Specialist Engineer responsible for both irrigation of agricultural crops and water resource management – the development of irrigation schemes, including Thabina, for resource poor farmers. These participatory Actions were undertaken during May 2003.
- An Official from the ARC, who is a Chief IT Specialist, assisted the researcher and the Senior Official from the DWAF in the identification of the various ICTs that would be applicable to contact the DWA and the various other information sources. As a WUA, the Thabina irrigation scheme had to submit information regarding the rules and regulations of the NWA (explained in Chapter 1) and would need a computer that could deal with spread sheets, as well as typing of several documents and correspondence regarding elections and representation of different population groups. These participatory Actions were undertaken during June 2003.

Following below is the outcome of the process where the ICT is identified in order to address the various NPFA. The various elements of the NPFA, and how they could be addressed are now presented in Table 5.1 to Table 5.17 according to the categories and sub-categories described above.

i) Infrastructure and land issues

- **Insufficient water**

Under infrastructure and land issues, various concepts regarding water, title deed and soil erosion, farm size and theft are discussed.

Table 5.1: Insufficient water

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
1. Insufficient water for irrigation, i.e. river does not produce enough water	Drought and hunger	Sufficient irrigation water which will ensure food security	Reliable water resources needed, e.g. construc-tion of dam or drilling of boreholes.	Information on the further development of the water resource (e.g. dam sites, off channel storage) and options on supplementing the resource (e.g. transferring water from adjacent catchments). Also on how to get by with the little water they have.	Department of Water Affairs and Forestry (DWAF) on investigations and the possible approval for making available sufficient irrigation water and on improved irrigation efficiency.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is reliable water resources and the information needs comprise information on the development of the water resource as well as how to get by with the little water they have. The method to address these information needs is to contact the Department of Water Affairs (DWA), which is the appropriate source.

Table 5.2: Canals and sub canals

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
2. Damaged main canal and sub canals	Lack of irrigation water in the fields	Repairs and upgrading of canals	Scheme rehabilita-tion	Information on cost effective methods of canal refurbishment as well as on the availability of subsidies from government departments for financial assistance on such works.	DWA on canal refurbishment and construction, and also on the availability of subsidies on water distribution infrastructure	Telephone fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is to repair broken pumps and the information needs comprise information on canal refurbishment and on the availability of subsidies from government. The information source to address these information needs is to negotiate with the DWA regarding the upgrading of canals and sub-canals.

Table 5.3: Pumps

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
3. Insufficient water pumps and frequent breakdown of pumps	Lack of irriga-tion water in the fields	Pumps to be sufficient and always in working condition	Repairs to broken down pumps and additional pumps needed	Information on pump repairs, more efficient pumping methods and the availability of subsidised production loans from the Land Bank and commercial banks.	Service providers to quote on pump repairs, and with DWA on pumping methods, as well as negotiating with Land Bank and commercial banks on subsidised production loans.	Telephone fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is the repair of broken down pumps as well as additional pumps, and the information needs comprise the information on pump repairs and pumping methods as well as the availability and procedure to obtain loans from Land Bank and other banks. The information source to address this information need is to communicate with service providers as well as the DWA, Land Bank and commercial banks.

Table 5.4: Waterflow

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
4. Poor water flow in the irrigated fields	Poor irrigation efficiency	More efficient irrigation	Land levelling	Information regarding land levelling contractors as well as alternative irrigation methods that will make land levelling unnecessary.	Service providers to quote on land levelling, and with the ARC on alternative irrigation methods.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is land levelling and the information needs are the information on land levelling contractors and irrigation methods. The information source to address these information needs is to liaise with service providers for quotes as well as to converse with the ARC.

Table 5.5: Drinking water

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
5. Poor access to domestic water	Lack of domestic water	To always have domestic water	Upgrade the domestic water pipe system	Information on the programme of the DWA for upgrading the domestic water supply.	DWA on domestic water supply.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is to upgrade the domestic water pipe system and the information need is the information on the programme of the DWA. The information source to address this information need is to negotiate with the DWA.

Table 5.6: Title deeds

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
6. Lack of title deeds to land	No permanent access to land	To own the land, invest in high value crops and become self sufficient	To change the present system of communal to private ownership	Information on the present status and on ways to participate in the campaign for the establishment of individual land ownership in tribal areas like Thabina.	Tribal authorities and the Department of Land Affairs on land rights. Liaison with the ARC.	Telephone, fax, e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is to change the present system of communal to private ownership and the information needs comprise the information on the present status, the establishment of individual land ownership and information on title deeds. The information source to address these information needs is to consult with the tribal authorities, the Department of Land Affairs and the ARC.

Table 5.7: Soil erosion

Problems	Fears	Aspira-tions	Needs	Agriculture-related Needs	Information source	ICT
7. Soil erosion a problem as contours have been ploughed down	Soil loss and no land to farm	To conserve the rich top-soil	Construction of contours to prevent soil erosion by water	Information on simple and affordable soil conservation methods as well as subsidies from the Department of Agriculture (DoA) to implement it.	DAFF on soil conservation, and on subsidies.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is the construction of contours to prevent soil erosion by water and the information needs comprise information on soil conservation as well as subsidies from the DoA. The information source to address these information needs is to confer with the DoA. In all the above instances, the telephone, fax and e-mail could be used to access and disseminate information in order to address the information needs.

Table 5.8: Farm sizes

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
8. Farm sizes inadequate	Not enough land to cultivate	More land	Open up more land for farming and new projects such as piggery, poultry farming	Information on how to extend their farming practices to hydroponics and on-farm processing, as well as other farming commodities like poultry, pig or intensive cattle farming.	DAFF and the ARC and consulting the Internet on hydroponics	Telephone, fax, e-mail and the Internet

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is that more land should be opened up for farming as well as new projects such as piggery, and poultry farming for income by the farmers. The information needs comprise information on farming practices and processing as well as other farming commodities. The information source to address these information needs is to communicate with DAFF and the ARC as well as consulting the agriculture-related web-sites on the Internet.

Table 5.9: Theft

Problems	Fears	Aspira-	Needs	Agriculture-related	Information source	ICT

		tions		Information Needs		
9. Theft of produce on the lands. Thieves also cut fences allowing livestock to enter the scheme	Hunger and deprived income	Implement ation of a security system	Security to prevent theft	Information on different security systems that can be considered to secure their crops	Service providers of security systems, fencing, etc.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is security to prevent theft and the information needs comprise information on security systems. The information source to address these information needs is to confer with service providers of security systems. The SAPS could also be made use of or a Neighbourhood Watch could be implemented.

ii) Service issues

Service issues discussed below include aspects such as tractors, co-operatives, seedlings, transport, Extension Officers and credit facilities.

Table 5.10: Tractors

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
1. Shortage of tractors and poor tractor services	Low yields	Better quality produce	Provision of adequate tractor services	Information on affordable ploughing contractors and minimum standards of ploughing for improved yields, as well as the availability of subsidised production loans from Land Bank and commercial banks.	Ploughing contractors and service providers for quotes, as well as with Land Bank and commercial banks on the availability of production loans.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is adequate tractor services and the information need is information on contractors and subsidised production loans from Land Bank and commercial banks. The information source to address these information needs is to discuss quotes with ploughing contractors, and production loans with Land Bank and commercial banks.

Table 5.11: Transport

Problems	Fears	Aspira-	Needs	Agriculture-related	Information source	ICT

		tions		Information Needs		
2. Transport to markets	Loss of income	Sale of good quality produce in order to improve income and have a better standard of living	A more efficient marketing system	Information on the day-to-day transport to markets	Transport contractors locally, in Polokwane and in Gauteng	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is a more efficient marketing system and the information need is information on transport to markets. The information source to address this information need is to communicate with local and Gauteng transport contractors as well as market agents.

Table 5.12: Extension Officers

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
3. Poor performance by Extension Officers	Low yields	Support of well-trained Extension Officers	Training of the Extension Officers	Information on ways to communicate their extension needs with the Limpopo Department of Agriculture (LDA), and how they can help to improve the services of the Extension Officers to farmers.	LDA regarding extension services.	Telephone, fax and e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is further training for the Extension Officers and the information need is information on communicating with the Limpopo Department of Agriculture on how they can improve the service of the Extension Officers to farmers. The information source to address these information needs is to negotiate with the LDA.

Table 5.13: Seedlings

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
4. Unavailability of vegetable seedlings	Lack of seedlings	To be assured of the seedlings when they have to plant	Construction of a nursery to supply vegetable seedlings to farmers	Information on the availability of vegetable seedlings and how to establish their own nursery.	Providers of vegetable seedlings, as well as with the ARC on how to establish their own nursery on the scheme.	Telephone, fax, e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is a construction of a nursery to supply seedlings to farmers and the information needs comprise information on vegetable seedlings and a nursery. The information source to address these information needs is to debate with suppliers of vegetable seedlings and with the ARC.

Table 5.14: Credit facilities

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
5. Lack of credit facilities to purchase crop inputs and equipment	Poor productio n by farmers	To become more produc-tive farmers	Access to credit	Information on the different credit facilities available to emerging farmers and how they can access it to their advantage. Also to acquire the necessary knowledge on financial management.	Land Bank, commercial banks and other potential funders and sponsors, and with DAFF on training in financial management.	Telephone e-mail

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is access to credit and the information needs comprise information on credit facilities and financial management. The information source to address these information needs is to negotiate with Land Bank, commercial banks, funders, sponsors and the then DoA.

iii) General issues

General issues discussed below are aspects regarding crop production, pests and rodents, as well as a clinic.

Table 5.15: Crop production

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
1. Farmers lack knowledge and skills on crop production under irrigation	Low quality produce and low yields	Self sufficien cy	Further training of farmers in all production aspects	Information on improving their own knowledge of crop production and soil and irrigation management in order to increase their yields and to improve the quality, and therefore the markets prices.	ARC and DAFF on crop production training, as well as consulting the Internet.	Telephone, fax, e-mail and Internet

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is training of farmers in all aspects of production and the information needs comprise information on crop production, and soil and irrigation management to increase their yields. The information source to address these information needs is to discuss with the ARC and DoA. The Internet can be added here to the ICT to address these information needs.

Table 5.16: Pests and rodents

Problems	Fears	Aspira-tions	Needs	Agriculture-related Information Needs	Information source	ICT
2. Wild animals and	Loss of produce	To protect their produce	Knowledge on how to fight pests	Information on affordable methods to fight pests that destroy their harvests, as	ARC and DAFF on fighting pests, as well as consulting	Telephone, fax, e-mail and Internet

rodents feeding on produce or destroying crops				well as innovative ways to bring back the natural enemies of these rodents.	the Internet for innovative alternatives.	

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is knowledge on how to fight pests and the information needs comprise the information on how to fight pests and ways to restore their predators, i.e., biological control. The information source to address these information needs is to consult with the ARC and DoA. The Internet can be added here to the ICT to address these information needs.

Table 5.17: Clinic

Problems	**Fears**	**Aspira-tions**	**Needs**	**Agriculture-related Information Needs**	**Information source**	**ICT**
3. Walk long distances to clinic	Security and health at risk	To have a clinic nearby	Build clinic near Thabina	Information on ways to communicate their medical and health needs, and to provide a clinic near them, to the Department of Health (DoH), as well as making use of tele-medicine on Internet.	DAFF and consulting the Internet on their health needs.	Telephone, fax, e-mail and Internet

Source: Findings from participatory research, Phase 1, Action 1, part 2

The need is to build a clinic near Thabina, as the nearest clinic was in Lenyenye, quite a distance away and transport was a huge problem, as the farmers did not have vehicles. The information needs comprised information on medical and health needs, a clinic and tele-medicine.

The information source to address these information needs is to negotiate with the DAFF as well as to obtain the information and communication technologies to address these information needs.

A summary of these problems, fears, aspirations and needs, as well as information needs and information and communication technology to address the information needs are presented in Appendix C.

The agriculture-related needs and information sources, as well as the information and communication technologies that could be used to successfully address the information needs, were successfully deducted from the NPFA in collaboration with the DWA and Management Committee. During the bottom-up approach and the participatory discussions, the Management Committee made comments, mostly regarding fences, title deeds, market prices, ploughing contractors, etc. Their main concern was that the researcher would have "to help us to contact these persons and places, because we don't know how". The researcher set their minds at ease by explaining that she would assist them with all actions

to be taken, as well as their training in the use of the information and communication technologies.

A brief summary of the findings regarding the information needs and the ways in which the information and communication technologies could address these challenges, derived from the above tables, is presented below.

i) Infrastructure and land issues

Information needs concerning infrastructure and land issues were identified as the development of the water resource; the refurbishment of the canal and subsidies; pump repairs and pumping methods with loans from Land Bank; soil conservation methods and subsidies from the then Department of Agriculture (DoA); and the expansion of their farming practices. Communication to address these information needs would be with (DWA), the Agricultural Research Council (ARC) as well as the DAFF. It should also be noted that requests for information would have to be typed on the computer and faxed to the relevant organisation. Enquiries would also have to be copied by a copier for filing purposes. Some of the information could also be obtained from the Internet.

ii) Service issues

Service issues were mainly concerned with information on more practical issues such as ploughing contractors and Land Bank production loans; prices of and advice on seed, seedlings, fertilisers, etc.; reliable market agents; and how to obtain credit. Sources of information for these information needs would mainly be the Land Bank, contractors and suppliers, fresh-produce markets and the then DoA, but also the Land Bank and Department of Land Affairs. Letters would have to be typed and faxed and/or mailed to the relevant organisations. Letters would also have to be copied for filing purposes.

iii) General issues

Information needs regarding general issues were the improvement of crop production, soil and irrigation management; to fight pests that destroy their harvests and ways to communicate their medical and health needs as well as a clinic. The information source would mainly be liaison with the ARC, the Department of Health and then DoA. It is also necessary to note that letters would have to be typed and faxed/mailed to the relevant organisation, and copies kept for record purposes.

This Section presented the categorising of the information and communication needs of the farmers in order to address the agriculture-related needs each with its information source and the applicable ICT. During the iterative feedback session, it was concluded that the role-players were satisfied with the categorising of the tables of the information and

communication needs linked to the agriculture-related needs with the information source and information and communication technologies to address these needs. Having obtained the consent of the role-players on the various agriculture-related information and communication needs, the meeting decided it was necessary to undertake the next Action, namely to explain this outcome to the Management Committee. These discussions are explained in the next Section.

5.6 EXPLAINING THE FINDINGS OF THE IDENTIFIED AGRICULTURE-RELATED INFORMATION NEEDS, undertaken by the researcher with role-players: May – July 2003: Action 2

This Section forms the Action 2 of Phase 1 and will comprise the discussions and explanations of the findings of the previous Section on the agriculture-related information needs to the Management Committee. This Action was important and essential, as the approval for the purchase of the applicable ICTs to address the identified agriculture-related information needs, would have to be obtained from the Management Committee.

The researcher discussed the agriculture-related information needs, the information resources and the possibility of using various technologies to address these agriculture-related needs with the Management Committee during the feedback session. By means of participatory observation the researcher realised that the Management Committee did not comprehend the tables regarding the identification of the information and communication technologies. Therefore the researcher discussed and explained which information and communication technologies had been identified, in a most simplistic manner to the Management Committee. The Management Committee had various questions related to the information and communication technologies identified, as they have never used it before: “Where will we put it?”; “Who will work it?”; “Who will buy it?”; “How big is it?; “Does it work with electricity?”; “We will have to secure the office against theft”; “Who will teach us to operate these machines?”. The researcher briefly explained to the Management Committee what the various identified information and communication technologies entail. After these explanations and also referring to the explanation of the Chairman previously (Section 5.4.1.3), the Management Committee was satisfied with the identification of the information and communication technologies, and asked whether it would be possible for the researcher to demonstrate the various information and communication technologies at a following meeting.

The researcher explained that a telecentre is based on these information and communication technologies. The Management Committee agreed that they first of all should be informed and directed what a telecentre entails before the technologies are to be

demonstrated and explained and that in the next Action (Action 3) the concept of a telecentre should be explained. (The demonstration of the information and communication technologies was undertaken in Action 4).

During the feedback session the researcher noted that the Management Committee was satisfied with the outcome of the identification of the agriculture-related information needs, as they expressed their agreement on not only the categorisation of the NPFA, but also that the agriculture-related needs had been identified. This observation was correct, as the Management Committee agreed with the agriculture-related information needs as well as the sources of communication in order to address these information needs. The researcher and farmers were familiar with the NPFA, but the fear of the farmers was "will we understand the information received from the machines?" and the researcher explained that the information received from the information and communication technologies would be translated into the indigenous language and explained to them by the Manager of the telecentre.

From the analysis made above, it is evident that technology such as the computer with typing facilities, the fax, telephone and the copier, could provide the necessary assistance to the farmers at Thabina to address their agriculture-related information and communication needs. Numerous web-sites were investigated and those which seemed the most important were identified. These most important web-sites identified in a participatory manner with the Management Committee, Mr. van der Merwe from DWAF and the IT Specialist from the ARC, are presented in Box 5.1 below. These web-sites were investigated in order to determine from where agriculture-related information could be obtained. Of course, as with the developing communities at the small-scale irrigation schemes in South Africa – especially those in the former homelands – the main communication system is the indigenous system which is by word of mouth. This means that the secretary of the telecentre, who is a school teacher, would, once a computer has been acquired, translate the information from the web-sites into understandable information and disseminate it by word of mouth to the Management Committee, who would inform the farmers during their meetings or when a problem is identified. Access to the Internet is, though, most likely to be unaffordable for a small-scale irrigation scheme in South Africa where the small-scale farmers can hardly afford to pay their contribution to the WUA, as prescribed by the NWA. The farmers did, though, express their feelings that they would like to subscribe to the Internet in order to visit the various agriculture-related web-sites once the telecentre is well underway.

The most important web-sites, searched during June 2003 that could address the information needs of the farmers included those of the:

- ARC (which have various institutes that supply information respectively on soil, water, climate, engineering, irrigation, fungicides and pesticides): http://www.arc. agric.za;
- Agrimark: http://agrimark.coop;
- SAFEX (South African Futures Exchange): http://www.dwt.co.za;
- DWA: http://www.dwa.gov.za;
- DAFF: http/www.daff.gov.za;
- LDA: http://www.lda.gov.za;

Box 5.1: Web-sites investigated

Source: Researcher's investigation and exploration as collaborated with the Management Committee

During this feedback session on the identified agriculture-related needs, all role-players realised that the establishment of a telecentre, based on these information and communication technologies, was the ideal solution for the farmers to address their agriculture-related needs which were concluded from the NPFA. The meeting also anticipated training of a Manager for the telecentre to be able to use the technology and saw the use of the technology as a prerequisite to addressing the agriculture-related and information and communication needs of the farmers.

With the iterative formative evaluation it became clear that the socio-economic and the ICT needs of the farmers would have to be identified as well as the appropriate information and communication technologies that could address them. The researcher would at a later stage, in collaboration with the Management Committee, compare the appropriate information and communication technologies identified for addressing the needs identified during the information and communications needs assessment as well as the structured interviews to be held in future on the socio-economic and ICT needs of the farmers.

The meeting decided that the next step to be taken was to introduce the concept of a telecentre to the Management Committee. This was undertaken in order to give the Management Committee the opportunity to decide whether they would want to establish a telecentre. The identification of the information and communication technologies presented by a telecentre, which could address the agriculture-related information needs of the farmers was successfully discussed and explained to the Management Committee, as the Management Committee understood and comprehended the importance of addressing the agriculture-related information needs of the farmers in order to assist and support the development of the Thabina community. The meeting consequently decided that the next Action could be undertaken, namely that the concept of a telecentre could be explained to the role-players, which formed Action 3 of Phase 1.

5.7 INTRODUCING THE CONCEPT OF A TELECENTRE: Action 3

The researcher explained how a telecentre was based on these technologies, and that their information needs could be addressed by communicating with agriculture-related organisations by means of technology and also that relevant information could be obtained via the Internet and e-mail. The researcher mentioned, though, that the Internet and e-mail might, however, be too expensive for them at that stage, which was 2003, before the telecentre was established.

For integrating indigenous culture with the western concept of a telecentre, a strategy was undertaken by the researcher: An analogue was used to illustrate the researcher's explanation of how a telecentre would fit into the management of the WUA, namely the concept of a wagon, being pulled from the mud by oxen. This analogue is illustrated in Photo 2 and was originally used by an expert in cultural communication. Although the farmers do not use ox wagons any longer, they fully understood the symbolism as it until recently still formed part of their culture as they used to take their produce to the market by ox wagon.

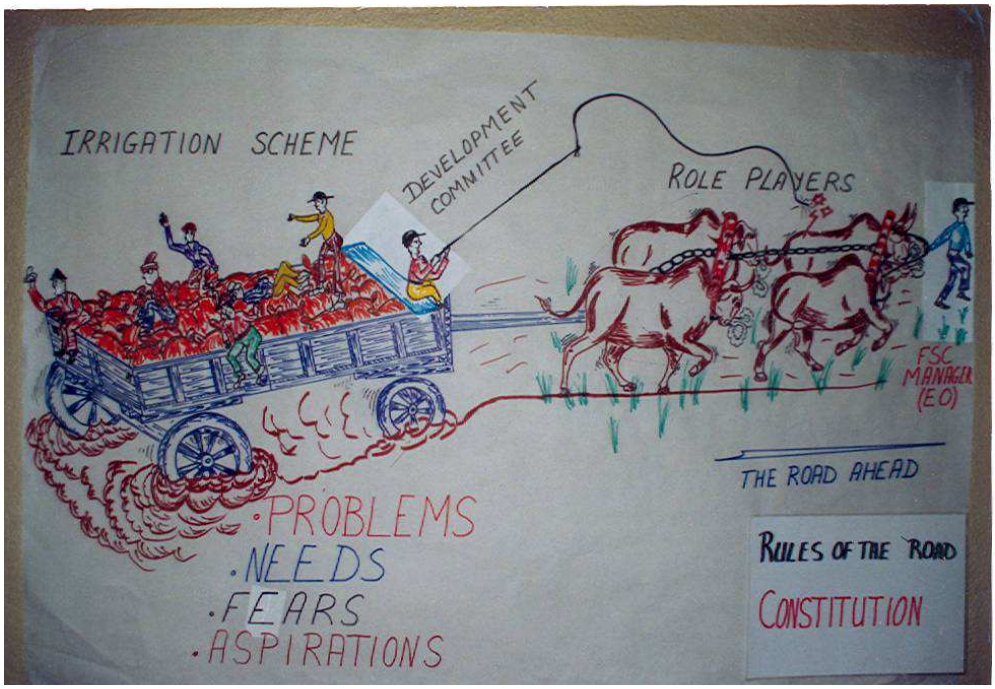


Photo 5.1: Photo of wagon pulled by oxen as used as analogue

The illustration was explained by the researcher as follows:

- The wagon with the people is the community, stuck in the mud. The mud represents the NPFA of the community.
- The Management Committee are the role-players (the oxen) that have to pull the wagon from the mud, with the community members on the wagon (community).
- The Chairman steers the wagon with the oxen along the road ahead. This symbolises prosperity.

By means of participatory observation, the researcher noted that the Management Committee was excited about the concept of the telecentre, as they had also earlier expressed their needs for an information centre. This observation was accurate as the members of the Management Committee, after the explanation, agreed that they are interested in the concept of a telecentre, "that can pull us from the mud". They also mentioned the fact that they had previously, during the investigation of Perret *et al.* from the University of Pretoria raised the idea of a 'telematic centre' and were eager to hear more about the telecentre concept. But they also had various questions on the information that could be obtained from the information and communication technologies, on which the telecentre would be based. Owing to the fact that most information received from the information and communication technologies would be in a different language, the farmers need this information to be converted and adapted into practical, understandable and simple solutions which could be done by the telecentre facilitator, or secretary. As it was not that easy to explain the various information and communication technologies, the researcher made the suggestion that she should demonstrate the various information and communication technologies to the members of the Management Committee, "So we can see what the machines look like and how they operate". The role-players decided to have a demonstration of information and communication technologies at a following meeting.

During the feedback session it was also evident at this stage that a strategy to operate these information and communication technologies should be developed, namely that the Manager of the telecentre would have to undergo training in the use of technology.

The researcher discussed this matter with the Management Committee during the iterative feedback session and all agreed that the researcher should present a demonstration of these information and communication technologies which could address the agriculture-related needs of the farmers.

In this Section the concept of a telecentre was explained to the role-players, which formed Action 3 of Phase 1. Since the Management was satisfied with the idea of establishing a telecentre at their irrigation scheme, they decided that the next Action could be undertaken, namely to have a demonstration during which the information and communication

technologies, presented and made accessible and available to the users of such a telecentre, should be demonstrated and explained. This demonstration will be discussed in the next Section, forming Action 4 of Phase 1.

5.8 DEMONSTRATION OF THE INFORMATION AND COMMUNICATION TECHNOLOGIES: Action 4

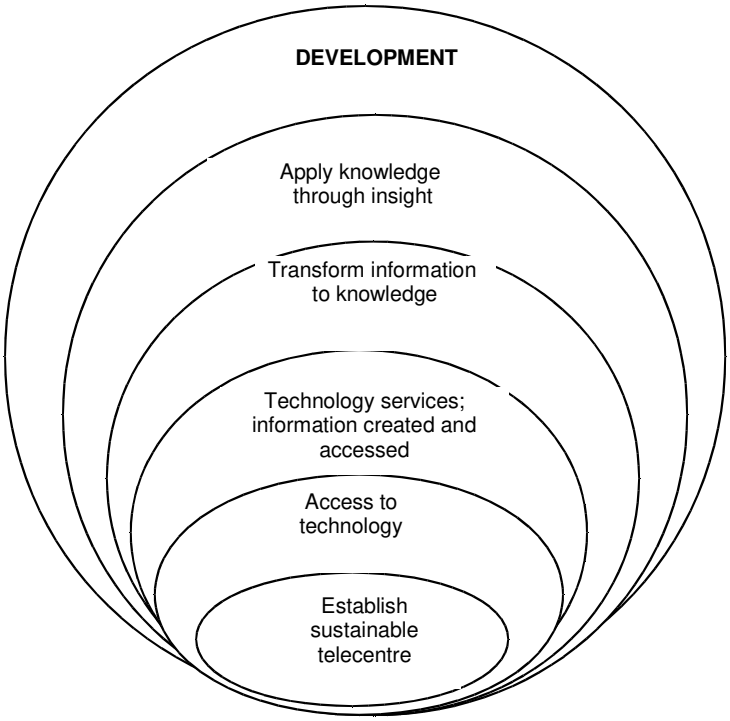
During Action 2 of Phase 1 the Management Committee asked for a demonstration of the information and communication technologies and the meeting agreed that this should be undertaken at a stage where the concept of a telecentre was understood by the role-players. Understanding and comprehending what a telecentre, based on these information and communication technologies would entail, this discussion led to the demonstration of the computer which was presented during the following meeting with the Management Committee in the building where the telecentre would be established. Owing to the then absence of electricity, the researcher used a laptop but she explained in detail, with photos to support, what the computer would look like. "Will we have enough space in the office; is the table big enough?" were some of the questions raised by the Management Committee. It was foreseen that electricity would be installed in the near future. During this demonstration, the various parts of the computer, like the keyboard, the monitor, mouse and memory were explained by means of photos.

The various applications of the computer, such as typing, e-mail and the Internet were then explained to the Management Committee. Remarks made by the Management Committee, such as "Now we won't do our finances by hand"; "Now we can type our letters and agendas"; "Now we need not make use of the Post Office to correspond"; etc., showed that they felt that a telecentre would greatly contribute to the success of their community in their development process.

The researcher prepared full-colour printouts of sketches and illustrations from the Internet beforehand and distributed them among the members of the Management Committee. They were easily understood. But where the information was technical, such as the maize price index, in-depth explanations were given. The researcher also explained the possible functions and advantages of the fax, printer, scanner and photocopier.

Figure 5.3 shows the technology support in the development of the community by means of a telecentre, based on information and communication technologies. The researcher developed this graphical design in order to explain the importance of information and communication technologies to the Management Committee:

Fig. 5.3 Support of technology in the development process



Source: Author's presentation

Although the researcher had, by means of participatory observation, concluded that the Management Committee would be interested in the establishment of a telecentre at their irrigation scheme, the Management Committee requested time "to discuss the matter between us". They met for about an hour *in camera*, during which time they decided on the establishment of a telecentre, and that they were willing to spend part of their income on it. This observation of the researcher was correct and the Management Committee realised that they would be able to communicate with other agriculture-related organisations through the information and communication technologies and that "information from the machines will improve our knowledge on our farming practices"; "the machines will help our children to study"; "the machines will help us to order seed"; "we could write letters to DWA and the LDA". They also understood where the telecentre would fit into the management of their WUA such as to computerise their management system as well as their financial system, and to be able to type their agendas and minutes, their memos and notes, and also letters and documents to agriculture-related organisations with whom they would then have to correspond, being a WUA.

During the feedback session it was commented that the agricultural community at Thabina would then have access to agriculture-related information, e.g. irrigation, product prices, market information, etc. As a Water User Association (WUA), they would also be able to

communicate with other agriculture-related organisations such as the government departments, financial institutions, markets, co-operatives, other WUA and research institutions.

During the iterative formative evaluation meeting, the role-players concluded that the demonstration was successful to the extent that the Management Committee agreed that the Thabina irrigation scheme could hugely benefit from the information and communication technologies, granted that they would be trained in the usage and management thereof.

This Section explained the demonstration during which the information and communication technologies were explained, Action 4. With this Action 4 successfully finalised, Phase 1 of the four-phase participatory process was completed. The next Section will present the evaluation of each Phase with PM&E as well as an explanation of the results in table format.

5.9 FORMATIVE PM&E WITH RESULTS, CRITERIA AND RESEARCH METHODS OF THE VARIOUS ACTIONS UNDERTAKEN

With the Actions of this phase successfully undertaken, these Actions are evaluated by means of formative PM&E and the results, criteria and research methods of these Actions are presented in Table 5.18 below.

Table 5.18: Formative PM&E with results, criteria and research methods of Actions undertaken for Phase 1

ACTION NO	ACTION	PM&E EVALUATION WITH RESULTS	CRITERIA	RESEARCH METHODS
ACTION 1	- Preceding action undertaken by Dr. Rutherfoord (1999 – 2000)	The preceding Action of Dr. Rutherfoord was successful, as the Management Committee decided at a later meeting that this NPFA could form the basis for further assessments at their irrigation scheme.. Results: This successful assessment of Dr. Rutherfoord resulted in the NPFA later forming the basis for the identification of the agriculture-related needs of the farmers of Thabina irrigation scheme, at a following meeting.	1. Meetings should include all those directly involved in the activities. 2. The results are examined relative to past experience.	1.Participatory discussions with Management committee 2.Participant observation with field-notes 3. Iterative feedback sessions
	- Approval for the establishment of a telecentre at the Thabina irrigation scheme by Government (2000)	By means of participatory observation during the participatory discussions, the researcher noted that the Director of NPDALE would agree that a telecentre, which he had no knowledge of before, could be established at the Thabina irrigation scheme. Results: 1. These participatory discussions resulted in the Director of NPDALE approving that the communication needs (NPFA) as identified could be used as a basis for identifying the then current information needs of the community. 2. Two letters (DG, Thabina) of approval were received.	1. Meetings should include all those directly involved in the activities. 2. The results are examined relative to past experience. . 3. Feedback is useful if it assists in decision-making. 4. The researcher should make it clear that the intervention does not belong to the researcher but that the intervention belongs to	1 Participatory discussions with LDA (Dr. Shaker). 2 Participant observation with field-notes 3 Iterative feedback session

	- Discussion on a telecentre addressing the information needs (2001)	Participant observation during the participatory discussion with the Management Committee indicated that although such an intervention was a totally new concept to the Management Committee, they were not reluctant towards the concept, as Dr. Shaker has approved the establishing of the telecentre at their irrigation scheme. The meeting successfully decided to use the communication needs of the telecentre (NPFA) (Appendix C) as a departure point for the study. Field-notes indicated that the many questions asked by the Management Committee regarding a telecentre, showed their positive enthusiasm of the establishing of a telecentre, such as to whom it would belong, the operation thereof and the operation of the ICT. Results: 1. The meeting agreed that a telecentre, based on information and communication technologies, should be established at their irrigation scheme. 2. Agreement to a demonstration of the ICT which would be described and explained in this Chapter 5 in Section 5.5, Action 3. The meeting decided that the information and communication	the community. 5.Preceding actions and research at the location should be taken into consideration 1. Meetings should include all those directly involved in the activities. 2.All role-players must take part in the decision-making processes.	1.Participatory discussions with role-players 2.Participant observation with field-notes 3. Iterative feedback sessions

	- Discussions on categorising the NPFA into agriculture-related needs (Jan. 2003)	technologies could enable them to communicate to various departments and agriculture-related institutions and agencies. 4. The outcome entailed that these NPFA could be seen as authentic and valid, as the identification of the NPFA was undertaken in collaboration with the community. 5. This Action resulted in iterative feedback sessions with the Management Committee which would be undertaken in future discussions with the Management Committee with the positive outcome that the NPFA would be used as departure point for identifying the agriculture-related needs of the farmers, as this NPFA was the opinions and viewpoints of the farmers, of which the Management Committee had previously approved of with GA. 6. During the iterative feedback session regarding the discussion with Dr. Shaker, the positive result was that the Management Committee was convinced that a telecentre could address the information needs of the Thabina farmers. This meant that the establishment of a telecentre could commence. Participant observation during the discussions indicated that the role-players, all being allies in the agricultural sector, fully comprehended aspects such as the NPFA of farmers. It showed that they were proficient to categorise this NPFA successfully into the various categories. Field-notes mostly contained the various different categories suggested by the role-players in which the NPFA could be successfully categorised – until all role-players approved of those categories decided upon: Infrastructure and land issues; Service issues; and General	1. All decisions must be comprehended by all role-players. 2. Research preceding the project must be taken into consideration.	1. Participatory discussions with role-players. 2. Participatory observation with field-notes. 3. Iterative feedback sessions 4. Iterative formative evaluations.

	- Categorising the NPFA into agriculture-related needs (Feb. 2003 - April 2003)	issues. Results: 1. The result of these participatory discussions was positive, as all role-players agreed on the various categories into which the NPFA should be categorised for the identification of the information needs, which led to the successful completion of Part (2). 2. Iterative feedback regarding the previous Actions, with special reference to the fact that the Management Committee was positive regarding the establishment of this new intervention, confirmed that the Management Committee agreed that a telecentre, based on information and communication technologies would be established at their irrigation scheme. Participant observation with field-notes during discussions between the researcher, Management Committee, the Extension Officer and an Senior Official from the DWA pointed out the importance of categorising the NPFA into a table format. This would lead to being able to a simple and straightforward explanation to the farmers in order for them to comprehend the situation. Results: 1. The Management Committee, an Senior Official from the DWA and the researcher effectually categorised the NPFA into Infrastructure and land issues; Service issues; General issues since the agriculture-related needs were successfully identified	. 1. Meetings should include all role-players. 2. Preceding actions and research at the location should be taken into consideration.	1. Participatory discussions with role-players 2. Participatory observation with field-notes

		and addressed according to the regulations and rulings of the NWA. 2. These discussions led to the successful identification of the agriculture-related needs of the farmers, each with its information source and information and communication technology to address the specific need. 3. The feedback session with the role-players on the field-notes taken resulted in the agriculture-related needs being successfully presented in table format which enabled successful explanations to the Management Committee. 4. During the iterative formative feedback session at the end of Action 1, showed that these Actions were successfully undertaken with special reference to the approval of the agriculture-related needs, complementing the previous Actions, and that the project could proceed to the next Action, Action 2.		
ACTION 2	- Discussion of the findings of the agriculture-related needs with the Management Committee, (analysing the physical and emotional world) (May – July 2003)	Participatory observation during the discussions with the Management Committee indicated that the Management Committee was satisfied with the outcome of the agriculture-related as well as information needs. The Management Committee accepted the identified agriculture-related needs, as it was based on the perceptions, needs, comments and remarks of the farmers themselves during the identification of the NPFA, which formed the basis for the agriculture-related needs. Field-notes discussed during the feedback session comprised various additional needs mentioned as contributions from the research participants as the process evolved as well as questions	1. To involve local, indigenous peoples as research participants in the research in a bottom-up approach. 2. Iterative evaluations should be undertaken at the end of each Action.	1.Participatory discussions with the Management Committee. 2.Participant observation with field-notes. 3. Formative feedback session 4. Iterative formative evaluations.

		regarding the application of ICT to address these information needs. With the discussion of these field-notes, during a feedback session with the Management Committee, each need that was addressed led to the expression of another question such as "How can we... "; "who will do it …"; "who will be responsible for …"; "Will we be able to…". These questions were addressed by the researcher in an explanatory, participatory manner and the result of this action was that the Management Committee expressed their gratitude and appreciation, such as that "now we can tackle and deal with our needs". Results: 1. The Management Committee accepted the identified Agriculture-related needs as valid, as it was based on the NPFA, identified by the farmers, adding new, then current identified needs, which were successfully addressed by the researcher. 2. Feedback meetings showed that this Action was successful and ensured that the quality of the activities is sufficient to provide good results. This Action also compliments previous Actions undertaken. 3. Iterative feedback on the previous Actions, with special reference to the identification of the agriculture-related needs, showed that the identification of the agriculture-related needs was successfully undertaken and that the project could proceed to the next Action, Action 3.		
ACTION 3	The concept of a telecentre and	Participant observation indicated that the Management Committee was satisfied with the outcome of the previous	1. Concern over understanding: During the course of the project	1. Participatory discussions with

	which needs it would fulfil were discussed with the farmers, including a model to measure usage of the information and communication technologies (develop a solution for the physical and emotional world) (Aug. & Sept. 2003).	discussions. They were eager and prepared to discuss the concept of the telecentre as such. Although field-notes taken during the participatory discussions revealed that the Management Committee still had many questions regarding the procedure for the setup as well as control and management of a telecentre, the farmers approved of the establishment of a telecentre at their irrigation scheme. During the feedback session, discussions of these field-notes resulted in the Management Committee agreeing that they needed a telecentre. Results: 1. The Management Committee showed that they were satisfied with the discussions on the findings of the identification of the agriculture-related needs. 2. Additional questions regarding the information and communication technologies were successfully addressed and explained. 3. The Management Committee agreed that they needed a telecentre, and that the project could proceed. 4. Iterative formative meetings concluded that this Action was successfully undertaken and also that it supports the previous Actions, with special reference to the discussion on the agriculture-related needs undertaken.	the researcher should ensure that the research participants should understand and comprehend the actions of each phase. 2. The researcher should make it clear that the intervention does not belong to the researcher but that the intervention belongs to the community. 3. Iterative evaluations should be undertaken at the end of each Action.	the farmers. 2. Participant observation with field-notes. 3. Iterative feedback session. 4. Iterative formative evaluations
ACTION 4	ICTs and printouts from the Internet were discussed with the Management Committee.	During discussions regarding the ICT, participatory observation indicated that the Management Committee was interested in the usage and operation of ICT at their telecentre. Field-notes revealed that the Management Committee had questions about the ICT regarding to whom it will belong as well as the usage	1.To involve local, indigenous peoples as research participants in the research process. 2. The researcher should make	1.Participatory discussions with the Management Committee 2.Participatory observation with field-notes

	(proposal for the physical world) (Oct. 2003).	and functioning of the ICT. During the feedback session of these field-notes with the Management Committee during the feedback session, these uncertainties were addressed, which resulted in a positive outcome, as the Management Committee decided that the information and communication technologies should be bought in order to enable the farmers to communicate, enabling them to address their information needs. Results: 1. The successful demonstration and discussion of the ICT as well as the successful addressing of question asked and remarks made, led to the Management Committee agreeing that they would employ ICT at their irrigation scheme. 2. Iterative formative evaluations meeting indicated that this Action was successfully undertaken and that it support the previous Actions, with special reference to the explanation of the concept of a telecentre.	it clear that the intervention does not belong to the researcher but that the intervention belongs to the community. 3. As participant observer the researcher takes part in research activities. 4. Iterative evaluations should be undertaken at the end of each Action.	3. Iterative feedback session 4. iterative formative evaluations
5	Formative PM&Evaluation (Nov. & Dec. 2003).	The iterative feedback session regarding all the formative evaluations of the previous Actions undertaken, indicated that the Management Committee was satisfied with the various Actions – they concluded that all Actions were completed successfully, especially because it was undertaken in a participatory manner where they could voice their concerns and ask questions. Field-notes discussed during the feedback session revealed that these formative evaluations at the end of this Phase could be executed successfully, due to the observations and evaluations of each of the Actions through-out the Phase: The evaluations of each Action concluded during participatory discussions with the Management Committee at the end of each Action, were merged during the feedback session with the Management Committee.	1. The formative evaluation after completion of Phase should be discussed and verified with the Management Committee. 2. Summative evaluation (*ex-post* evaluation) should be undertaken at the end of the participatory project	1.Participatory discussions with the Management Committee 2.Participant observation with field-notes 3. Iterative feedback session 4. Formative evaluations 5. Questionnaires 6. Summative evaluations

		Summative evaluation (*ex-post* evaluation) was undertaken at the end of the evaluation of the participatory project. . Results: 1. The positive reactions of the Management Committee where no special or additional queries of difficulties were noted in field-notes, led to the various Actions being completed successfully. 2. The merged formative evaluations made a huge contribution to the outcome of the summative evaluations. 3. Special to note is that the successful training afterwards in the ICT resulted in the computerization of the Management System as well as the Financial System, which identified the poor financial situation of the irrigation scheme (Establishment Phase). 4. Summative evaluations resulted in the Management Committee agreeing that the Thabina irrigation scheme would hugely benefit by the establishment of a telecentre and that the project was completed successfully.		

This Section presented the formative evaluation of the Phase with PM&E as well as the criteria and research methods, in table format. The next Section will present a summary of the Chapter.

5.10 SUMMARY

The Introduction of Section 5.1 explained what this Chapter would entail: In this chapter, two issues were dealt with: Firstly, a description of the actions identified in Chapter 4 as they were applied at the Thabina irrigation scheme. Section 5.2 presented the background of the study: How the various Actions of Phase 1 proceeded with the evaluation of each Action. Section 5.3 engaged in an explanation of the actions taken towards the establishment of a telecentre with Section 5.3.1 explaining the preceding actions of Phase 1, Action 1, namely Section 5.3.1.1 regarding the identification of the NPFA; Section 5.3.1.2 described the obtainment of the approval from government for the establishment of a telecentre; and Section 5.3.1.3. discussed the decisions made whether a telecentre could address the information needs. Section 5.4 described the actions taken towards the establishment of a telecentre with Section 5.4.1 explaining the preceding actions of Phase 1, Action 1, namely Section 5.4.1.1 regarding the listing of the NPFA; Section 5.4.1.2 describing the obtainment of the approval from government for the establishment of a telecentre; and Section 5.4.1.3 explaining the decisions made whether a telecentre could address the information needs. With the preceding actions explained, Section 5.5, with the unfolding of Phase 1, described the identification of the agriculture-related needs, the information needs and the applicable information and communication technologies to address these needs, derived from the NPFA, in table format. Section 5.6 explained the agricultural needs identified after which Section 5.7 described how the concept of a telecentre, based on information and communication technologies, was explained and described to the Management Committee. After the concept of a telecentre was understood, Section 5.8 dealt with the demonstration of the information and communication technologies that address these agriculture-related needs. Section 5.9 presented PM&E with results, criteria and research methods of the various actions undertaken Section 5.10 is the summary of the chapter.

With Phase 1, namely the Pre-establishment Actions undertaken from 1998 – 2003, of the four-phase participatory process for the establishment and evaluation of the Thabina telecentre project successfully executed and finalised, the participatory project could commence to the next Phase, Phase two which entailed Chapter 6, the Preparatory Phase: Actions before the establishment of the telecentre. These Actions will be discussed in the next Chapter, Chapter 6.

CHAPTER 6 – PREPARATORY PHASE: ACTIONS BEFORE THE ESTABLISHMENT OF THE TELECENTRE

6.1 INTRODUCTION

The previous Chapter, Chapter 5, described, explained and evaluated the Actions of the Pre-establishment Phase, which formed the first Phase of the four-phase participatory process. Actions of Phase 1 included Actions such as the preceding Actions taken before the project could commence, as well as the identification of agriculture-related needs, the introduction of the concept of a telecentre to the research participants and a demonstration of the information and communication technologies.

But there were also some preparatory Actions that had to be undertaken, approved of and evaluated before the telecentre itself could be established. The purpose of the Chapter is consequently to discuss how these Actions unfolded and then to interpret and evaluate these Actions which were executed in this Phase 2 of the four-phase participatory process, according to PM&E. The Actions undertaken in this Phase could be summarised as follows: One of the researcher's core objectives was to break new ground in terms of addressing challenges of the small-scale irrigation farmer's interim needs. In Phase 2 of the four-phase participatory process, the challenges faced by the small-scale farmers, especially the Management Committee of Thabina, comprised several Actions to which they were not only inexperienced, but which they had to understand and approve of. These Actions entailed their involvement in the process of compiling, comprehending and approving of several administrative documents which were procedures in which they were inexperienced; to be involved in the identification and approval of the socio-economic and ICT needs of the farmers, activities to which they were unfamiliar with; and to be involved in and approve of the compilation of an interview schedule which was an unfamiliar process and concept to them. The interview schedule which was compiled in order to identify the socio-economic and ICT needs of the Thabina farmers was outlined to be related and valid to the socio-economic and ICT needs of the farmers of the Thabina irrigation scheme. The interview schedule on these socio-economic and ICT needs applicable to the farmers of Thabina was ascertained through various participatory discussions with the researcher, the Management Committee and the Extension Officer.

Through this Chapter, these new challenges are researched, explored and evaluated by means of the PM&E in the following Sections: Section 6.1 presented an Introduction to the Chapter. Section 6.2 presents background on how Phase 2 proceeded; Section 6.3 explains the various actions for Phase 2 and evaluation thereof; Section 6.4 gives a brief overview of what could be expected from this Chapter: the various Actions to be undertaken in the Preparatory Phase of the four-phase participatory process. Section 6.4.1 describes the general procedure of the collation of the documents, with Section 6.4.1.1 a discussion of how to compile documents including Section 6.4.1.2 with the explanation on the various matters of the Project Plan and suggestions and remarks by the Management Committee and Section 6.4.1.3 with the discussion on the seven features of the

document on 'How to manage a telecentre'. Section 6.4.2 describes how the socio-economic needs were identified: Section 6.4.2.1 discusses the interview schedule; Section 6.4.2.2 regarding the completion of the interview schedule: Section 6.4.2.2.1 the process during the structured interview; Section 6.4.2.2.2 process for completing the interview schedule; Section 6.4.2.2.3 explains the flip charts; Section 6.4.2.2.4 presents a discussion on the field-notes taken; 6.4.2.2.5 presents the participatory discussion regarding the interview schedule and Section 6.4.2.2.6 explains the field-notes taken during the process. Section 6.4.3 explains the participatory discussions regarding the interview schedule and identifying of the ICT. Section 6.4.4 evaluates the success of the Phase by means of Participatory Monitoring and Evaluation with results, criteria and research methods. Section 6.5 presents a summary of this chapter.

Before an explanation on the Actions and the evaluation of the Preparatory Phase undertaken can commence, it is necessary to present a background of how this Phase proceeded, developed and evolved. These aspects, such as the managerial documents compiled; the identification of the socio-economic and ICT needs, which included the compilation of the interview schedule; the participatory discussions of the outcome of the interview schedule with the Management Committee and the identification of applicable ICT are explained briefly in the next Sections.

6.2 BACKGROUND ON HOW PHASE 2 PROCEEDED

The following is an overview of how Phase 2 proceeded and evolved: Documents to small-scale farmers such as the Project Plan and a document on managing a telecentre were compiled and discussed by means of interactive participatory discussions with members of the Management Committee as prescribed on 'Setting Objectives' in the methodology in the Traditional Management Approach (Chapter 4, Section 4.2.2.1).

An interview schedule on the socio-economic and ICT needs in order to study the emotional world of the small-scale farmer was compiled by the researcher, the Management Committee and the Extension Officer. The Management Committee and the Extension Officer understood the socio-economic needs of the Thabina farmers and could therefore distinguish the related questions. The researcher could contribute to the aspects relating to the information and communication technologies. Documents compiled were:

- The project plan was necessary to explain the various aspects of the project such as the perspectives, the target groups, stakeholders, and research instruments.
- The document on managing a telecentre could be used by the secretary who herself has never managed an office before.
- The objective of the structured interview during which the interview schedule was completed, was to determine the socio-economic and the ICT needs of the farmers of the Thabina irrigation scheme.

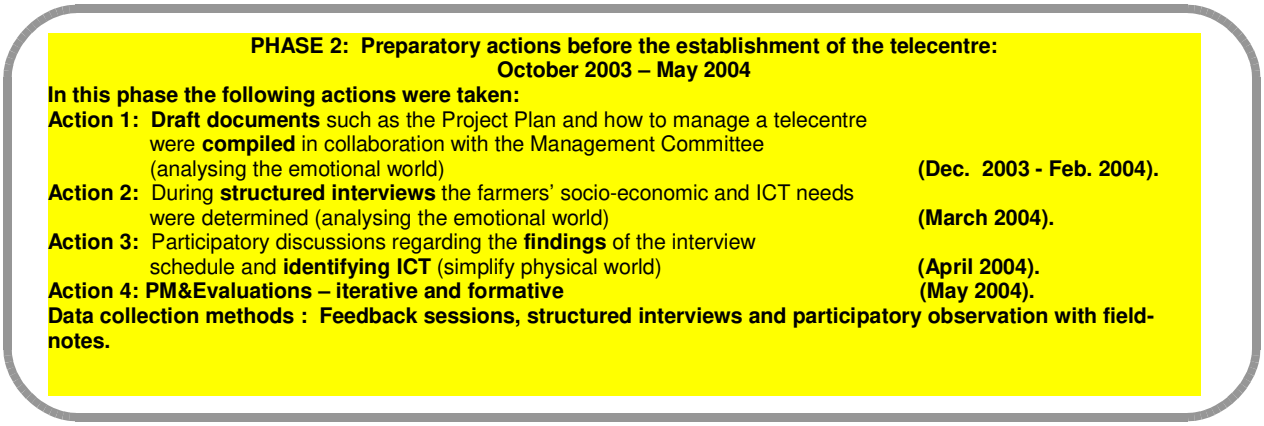
This interview schedule was completed by the research participants, the farmers, during structured interviews where Extension Officers as well as the questions on flip charts in the local language assisted with language issues, as well as sketches to assist with the comprehension of the questions. By integrating these socio-economic and ICT needs with the agriculture-related information needs the applicable information and communication technologies that could address both these sets of needs, were identified in collaboration with the Management Committee in order to meet these various needs of the farmers.

With the various preparatory Actions indicated that were undertaken in this Phase indicated, it is necessary to look at when these Actions, as adapted from the generic four-phase participatory process and applied to the Thabina project, were undertaken. The next Section will present these Actions within the time-line in which these Actions were executed.

6.3 TIME-LINE OF THE ACTIONS FOR THE PREPARATORY PHASE AND EVALUATION THEREOF

A time-line of the Actions undertaken and explained in this Chapter is summarised in Figure 4 below, with the various Actions, after which an explanation of each Action will follow. This Chapter forms Phase 2 of the Four-Phase Participatory Process as discussed in Chapter 5.

Figure 6.1: Phase 2 of the four-phase participatory process



Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

Action 1 (Oct. 2003 – Feb. 2004): Analysing the emotional world. Draft documents were compiled by the researcher to be discussed with and approved by the Management Committee – the facilitator listens well and tests that she has understood what the people have said. These documents are a powerful set to understand the needs of the telecentre communities. Data collection methods used were participatory observation with field-notes and feedback sessions;

Action 2 (March 2004): Analysing the emotional world: During structured interviews the socio-economic and ICT needs of the small-scale farmers of the Thabina irrigation scheme were

determined by means of an interview schedule, as they would differ from those farmers at commercial or universal farming communities. The specific and relevant socio-economic and ICT needs of the farmers of the Thabina irrigation scheme were identified, based on questions regarding language, literacy, child nutrition, doctors and health-care. Data collection methods used was feedback sessions, structured interviews and participatory observation with field-notes;

Action 3 (April 2004): Simplify physical world: The findings on the socio-economic and ICT needs were discussed in a supporting, participatory manner during a feedback session with the Management Committee. The opinions and suggestions of the Management Committee were taken into consideration with all participatory discussions regarding the identification of the ICT to be bought in order to address these needs. Data collection methods used was a feedback session and participatory observation with field-notes;

Action 4 (May 2004): Formative PM&E was undertaken in this cross-cultural dialogue, as the farmers were understood from their own frame of reference. Data collection methods used was feedback sessions and participatory observation with field-notes.

In this Section the preparatory Actions undertaken during Phase 2, with reference to the involvement of the Management Committee, were explained and presented in a time-line. With the Actions explained in the time-line undertaken, the Chapter explains how the Chapter evolves with a description and explanation of the various Actions undertaken in the Preparatory Phase of the four-phase participatory process.

6.4 ACTIONS UNDERTAKEN IN PHASE 2.

The remainder of the Chapter explains the Actions undertaken before the actual establishment of the telecentre could proceed, as will be explained in the next Chapter, Chapter 7. The Actions in this Phase 2 entailed the compilation of several managerial documents; the identification of the farmers by means of an interview schedule, compiled in collaboration with the Management Committee and the Extension Officer in order to outline the specific socio-economic and ICT needs of the farmers of the Thabina irrigation scheme; the identification of the target population and the data collection methods; an explanation of the process followed to complete the interview schedule; and the participatory discussion held with the Management Committee on the outcome of the interview schedule and the identifications of the applicable ICT to be bought to address the needs of the farmers of the Thabina irrigation scheme.

The following Sections explain the actual execution of the various Actions which were undertaken in this Phase. The next Section, Section 6.4.1 is an explanation of the participatory discussions and feedback sessions during Action 1, which entailed the compilation of various documents, in participatory collaboration with the Management Committee.

6.4.1 Compilation of documents: General procedure: Action 1

With the background on this Phase explained, the first Action is explained and evaluated in this Section. This Action comprised the compilation of several documents which could assist and support in the management and operation of the Thabina telecentre. This Action forms Action 1 of Phase 2.

The Management Committee agreed that it would be best if the documents were drafted beforehand: "we do not now how to draft such documents". This was agreed on telephonically. A draft of each document was drawn up by the researcher in her office. The documents were drafted in English, while the keywords of every document were written on a flip chart in Tsonga, the local language. The translations of the words were provided by UNISA.

The documents were discussed during the participatory discussions and a school teacher was involved in translating all questions asked and answers presented. The Management Committee provided their input after discussing each specific point as highlighted below. All suggestions from the Management Committee, as well as the participatory observations made by the researcher, were noted in field-notes and incorporated into each document. After each meeting the documents and notes were studied and typed by the researcher in her office. At the feedback sessions the researcher checked these documents with the Management Committee in order for them to approve thereof, as these documents are powerful to understand the needs of the telecentre communities. In this Section a short overview was presented on how this first Action was executed. The next Section offers an explanation of the documents that were compiled in Action 1 of the Phase. These documents compiled during this Phase are discussed in the next Section.

6.4.1.1 Documents

Firstly, the compilation of the Project Plan is discussed, followed by participatory discussions on the compilation of the document on the management of a telecentre. This participatory approach where all role-players took part in the participatory discussions was successful because the Management Committee expressed their satisfaction and approval of these documents. Field-notes of conversations which were taken into consideration were explained and discussed with the Management Committee during feedback sessions.

6.4.1.2 Project Plan

In this Section, the various aspects of the project plan for establishing a telecentre are discussed and explained. Participatory discussions on the project plan were held, with reference to the following aspects:

- The initial set-up – the situation at the beginning of the project;
- The objectives – the intended outcomes of the project;
- Long-term perspectives – the expectations of the project;

- Project outcomes –the intended benefits to the community of the project;
- Project outputs – what the project could offer to the community;
- Potential target groups – the projected beneficiaries of the telecentre;
- The organisational set-up and management – how the telecentre should be organized and established;
- The operator/staff – who would manage the telecentre;
- Stakeholders – who was to be involved in the project and benefit from the project;
- Research instruments – how the findings of the research would be measured.

The meeting to discuss the project plan was held during November 2003 with the Management Committee. It was held in the hall adjacent to the office where the telecentre would be situated, and lasted from 10:00 till 16:00. The members of the Management Committee were dressed in clean, nicely ironed shirts, and one even wore a tie. This shows that they were about to attend a very important meeting and that they had high expectations of the outcome of the participatory discussions as well as respect for the researcher. Their anxious faces were evident of their expectations of this huge venture they were about to embark on – the establishment of a telecentre at their small-scale irrigation scheme. Each participant who had a question raised his hand to draw attention. The atmosphere was one of expectation, as the Management Committee had never compiled such documents before, but as the meeting proceeded, they became more comfortable and more and more ideas were exchanged.

The process of discussing the aspects of the Project Plan will now be explained.

- **Initial setup**: The Management Committee was presented a brief summary of what had been decided by the Management Committee up to that point. The situation included a letter from the Management Committee with the decision to establish a telecentre (Appendix E) through which the members of the Thabina community, especially the farmers, would be exposed to various information and communication technologies, and be able to communicate with other agriculture-related organizations – “we’ll have to communicate with Water Affairs”; “we can order seeds and fertilizer from the co-ops”; “we must communicate with other WUAs”; “we can obtain weather information”. Observing the situation, the researcher gathered that the Management Committee still agreed with the establishment of a telecentre, as they did after the demonstration of the various information and communication technologies.
- While discussing the objectives of the project plan, the Management Committee listened attentively. They expressed their opinions and the following objectives were decided upon by the Management Committee:

- The Management Committee agreed that the first objective should be for all role-players – "the Management Committee, the Thabina community, all farmers and the organisation where the research was registered as a project" – should be involved in the communication process.
- The Management Committee saw the establishment of access to telecommunication infrastructure as the main objective. Infrastructure such as a "computer" and a "printer-copier-fax-scanner" –in this thesis called the 'multifunctional printer' would be bought depending on the "extent of funding that could be obtained from sponsors".
- Procuring funds was the next objective. The members of the meeting estimated a cost of R25 000 for a computer and a multifunctional printer, while there was "only a total of R10 000 available at this stage", which was not quite correct – although the WUA has sold a centre pivot for R10 000, the income went to the various accounts the WUA had with the co-op, the Post Office and the market. The former estimate was based on quotations received from various information and communication technology vendors.
- The Management Committee and the researcher agreed that the researcher would try to obtain funds for the outstanding amount from sponsors, "that will be done by Ms. van der Merwe".
- All agreed that the "Limpopo Department of Agriculture (LDA) must be asked to paint the building and install a ceiling and flush toilets", as the buildings then still belonged to the LDA.

- During the participatory discussions of the long-term perspectives, the Management Committee decided that the information and communication technologies of the telecentre would contribute to "communication with agriculture-related organizations" as well as to obtaining information. This was the most important perspective to them. Other goals decided on were to increase "the level of computer literacy of the Management Committee"; "to enable surrounding schools and the Technikon to make use of the information and communication technologies"; and "to increase information and communication channels available" to "groups like the farmers that need information on markets, weather and crop cultivation".
- After lengthy participatory discussions the Management Committee felt that the project outcomes would be the provision of "agricultural information and communication services".
- With regard to the project outputs the Management Committee was greatly impressed with the full-colour printouts from the computer, shown to them during the demonstration of the information and communication technologies, but they mentioned that the "Internet should

not be included here, as it is costly and we do not feel we could afford it at this stage". The Management Committee decided that "once we will be in a better financial position, we would definitely subscribe to the Internet and e-mail". The Management Committee also agreed that "typing, printing, copying services, a public telephone and fax facilities must be offered at our telecentre".

- When discussing the potential target groups of the telecentre, the Management Committee felt that the "main target group should be the Thabina community". This would include the "management committee, the leaders of the community, the members of the community, the users as well as key groups such as women's groups, farmers, students and educators". After some participatory discussions it was decided that the surrounding communities should also be allowed to use the telecentre, as it would "bring in some money".
- When discussing the organisational set-up and management, the Management Committee felt that the telecentre should be located in the existing building on the premises. On the issue of facilities and equipment, the Management Committee asked the researcher to look into the "various items that would be needed for an office, like "pens, paper", etc. The Management Committee reminded the researcher that it did not have adequate funds to buy a computer as well as a multifunctional printer. They felt, however, that once sufficient funds had been procured, they should start with the latter, so that "we could at least be able to communicate with other agriculture-related organizations while we save for a computer". The researcher agreed with them, and assured them once again that she would look for funding.
- On the issue of operator/staff, the Management Committee felt that they should appoint a full-time secretary. The Vice-Chairman mentioned a trained schoolteacher who was not working at the time. The Management Committee decided that she would be "competent to run such a centre" and that the "Chairman would discuss the matter with her". The farmers pay monthly levies for their water from the irrigation scheme and the Chairman suggested that her salary would be paid from this source.
- On the issue of stakeholders, the Management Committee suggested that "the whole community" such as the management committee, members of the community, leaders of the community, users, indirect users, and key groups such as women's groups, farmers, students, educators and youth; funding organizations; and the Limpopo Province Department of Agriculture should be included. The Management Committee asked that the name of Dr. Rutherfoord to be added to the list.
- The researcher explained to the Management Committee that data collection methods such as participant observation and the feedback sessions would be used to collect information. They felt that it was important to conduct these feedback sessions as this will present the

opportunity for two-way participatory discussions and that all aspects could be explained by means of flip charts. The researcher asked the Management Committee for its approval for the farmers to complete interview schedules on socio-economic and ICT needs. As mentioned in the previous Chapter, the agriculture-related needs were identified. Because the Management Committee mentioned the identification of socio-economic and ICT needs previously, the meeting decided to do a survey on the socio-economic and ICT needs, which was discussed in the previous Phase (Chapter 5: 5.4.1.3) of the farmers as well as whether the farmers would want a telecentre, and whether they felt that they needed the information and communication technologies. The other research instruments entailed participant observation and performance monitoring, and after the researcher explained it to the Management Committee, they agreed that these instruments could be used for the research.

At 13:45 all aspects of the project plan were discussed and the Management Committee expressed their satisfaction with the project plan. It seemed that they were pleased with the document because all their suggestions and contributions made were incorporated in the final document. After participatory discussions on the various Actions to follow, with a brief discussion on the next document to compile, the meeting closed at 16:00 and the Management Committee left. The researcher stayed behind to make the following notes:

6.4.1.2.1 Field-notes of Action 1: The compilation of the Project Plan

- "Good rapport was established between me and the Management Committee. This could probably be attributed to the fact that I had by then worked through a number of workshops with them, have involved them in all the decision-making processes and also that I have listened well with empathy and tested whether I understood what they wanted and meant. The Management Committee took part in all participatory discussions. After I had explained each concept, they asked questions and made suggestions and recommendations. They were satisfied that I would incorporate all their suggestions in the document when I typed the documents in my office afterwards.

- "The non-verbal communication of the Management Committee was important, as non-verbal communication shows real feelings. Non-verbal communication is the process of communication through sending and receiving covert messages. Such messages can be communicated by means of gesture, body language, facial expression and eye contact. Throughout the meeting I observed the non-verbal communication closely – including facial expressions, their dress, tone of voice, attitude, movement and body movements. This was especially during the participatory discussions on the various aspects of the Project Plan – they smiled and looked comfortable and relaxed during the participatory discussions.

- "The only time they tended to look concerned was when the money matters were discussed, which reflected that they felt this aspect to be a problem: They all leaned forward in their

chairs with very anxious facial expressions. This body language also supported the concerned questions they have asked.

- "Otherwise, their facial expressions and body language indicated throughout the participatory discussions, that they were much interested in the participatory discussions and that they were exceptionally enthusiastic to proceed with the establishment of the telecentre. Their body language was relaxed, and they used hand gestures when explaining their suggestions. This lead to the conclusion that they took part in the discussions in a participatory manner, and that they enjoyed the participatory discussions".

These field-notes were discussed in detail with the Management Committee and approved by them. They agreed that since they decided who to appoint as secretary, it was important to finalise how the telecentre would be managed.

These productive and successful participatory discussions on the compilation of the Project Plan and its field-notes resulted in the finalization and approval of the Project Plan by the Management Committee, as discussed in this Section. In the next Section the compilation and approval of the document on 'how to manage the telecentre' is discussed.

6.4.1.3 'How to manage a telecentre'

A second meeting was held during January 2004. The intention of the participatory discussions at the meeting was to compile a document on how to manage the telecentre. The management of a telecentre could be seen as an important objective regarding the development of this small-scale irrigation community. On the arrival of the researcher, the Chairman of the Management Committee, the Vice-Chairman, a member of the Management Committee and the secretary welcomed her.

The participatory discussions where the researcher would be the observer in the participatory process entailed how the telecentre would be managed. These participatory discussions took place in the office which would serve as the telecentre. The Chairman felt that it was only necessary for the Vice-Chairman, the secretary and the researcher to be present. While the Vice-Chairman mostly agreed with the researcher's suggestions, he did propose some amendments.

During the participatory discussions the researcher made her field-notes. The various aspects of the document on managing the telecentre are discussed below.

- **Timetable**

  The secretary agreed with the researcher that the manager would be "there at all times during the day" and that a timetable of activities**,** which the researcher suggested, was unnecessary.

- **Money matters**

The Vice-Chairman also mentioned that the secretary should "count the amount of cash money, as well as the number of articles in stock, each morning". All agreed that it was not necessary for the secretary to give a daily report, which the researcher suggested. The Vice-Chairman did suggest, however, that the "cash should be banked every week".

- **Personality**

  The researcher did not make any notes on skills, competencies and behaviour**.** The Vice-Chairman agreed that the secretary would have the skills to run a telecentre, as "she was a trained schoolteacher". The Vice-Chairman wanted the telecentre to be managed professionally, as discussed in Section 3.3 in Chapter 3. The secretary also felt that she "would be able to operate all equipment after I am trained in the use of the machines".

- **Closing time**

  The Vice-Chairman and the secretary agreed upon the closing time activities such as to "cash up all money" and "close the computer".

- **Complaints handling**

  It was clear from his body language that this section was important to the Vice-chairman although the secretary was a bit embarrassed by the participatory discussions regarding this aspect. The Vice-Chairman felt strongly about this point, as 'people from communities outside Thabina would also use the telecentre'. After detailed participatory discussions the meeting decided that if there were serious complaints that she could not handle, she would refer the complaint to the Vice-Chairman. He would then handle the complaint.

- **Programme for training**

  There was a debate on the issue of a training programme for the secretary in the use of information and communication technologies once it was bought**.** The researcher suggested one week of training, but the secretary, who has never operated a computer before, felt it was 'too short'. After participatory discussions it was decided that the researcher would give one week's training and if necessary, pay the telecentre more visits in order to address problems. (The researcher had to visit the telecentre four times afterwards, to solve problems with the use of the Excel programme. Problems were also addressed over the telephone).

- **Services rendered**

  A price list for rendering services (Appendix M) was compiled according to the prices suggested by the Vice-Chairman based on prices which he and the researcher had previously communicated by telephone. These prices were obtained over the telephone from organisations that offer these services, such as PostNet and a telecentre in Mamelodi.

Field-notes were taken by the researcher as participant observer regarding the participatory process according to which the document on 'managing a telecentre' was compiled. These field-notes were discussed with the Management Committee at the feedback session and they agreed with the field-notes, as it was they themselves who suggested some changes.

6.4.1.3.1 Field-notes of Action 1: 'Management of the telecentre'

These field-notes comprised the following:

- "My observations are that the secretary was a bit uncomfortable when she saw the previously drafted document on managing a telecentre. It seemed as if she was worried that she would not be able to achieve all routines which were suggested. But as the participatory discussions progressed, she became more relaxed, which I thought was because she felt that she would be able to do what was expected of her. She agreed to most of the points discussed, while the Vice-Chairman was the one who made the suggestions.
- "Some changes were suggested by the Vice-Chairman, such as that the "secretary would not have to complete any financial forms by the closing time of the telecentre", and that "a cleaner would be appointed to clean the telecentre.
- "Through the participants' body language and comments and suggestions, it was noted that the participants agreed on each aspect discussed".

This Section formed Action 1 and described the compilation of the documents needed for the establishment as well as the management of the telecentre. It was, though, also essential for the telecentre to succeed addressing all the needs of the farmers – not only the agriculture-related needs as derived from the NPFA in the previous Chapter, forming Phase 1 of the four-phase participatory process, but the socio-economic and ICT needs of the farmers at the Thabina irrigation scheme.

In the next Section, forming Action 2, the course followed to determine the socio-economic needs of the farmers of the Thabina irrigation scheme, is explained.

6.4.2 DETERMINING THE SOCIO-ECONOMIC AND ICT NEEDS OF THE FARMERS: Action 2

This Section explains how the socio-economic and ICT needs of the farmers of the Thabina irrigation scheme were identified. The interview schedule, by means of which the socio-economic and ICT needs were identified, is explained.

Discussions on the importance of undertaking a survey regarding the agriculture-related needs of the farmers was previously made in Phase 1 of the four-phase participatory process (Section 5.6) with the explanation of the findings of the identified agriculture-related information and communication needs. The socio-economic and ICT needs of the farmers were determined by

means of an interview schedule that was completed during structured interviews. The background against which the interview schedule was drafted is discussed in order to contextualise the compilation of the interview schedule.

The identification of the sample size was discussed in detail in Chapter 4 in Section 4.2.7, and in this Phase the outcome was discussed and evaluated.

> With the ME explained to the Management Committee, a ME of 6% was chosen during participatory discussions at a meeting and the random sample of the 150 farmers had the following conclusion: According to the stratified sampling method, the target population was 150. With a sample size of 84, the following number of farmers was chosen to complete the interview schedule:

Ward A	12 out of	22 farmers;
Ward B	25 out of	44 farmers;
Ward C	21 out of	37 farmers;
Ward D	26 out of	47 farmers
TOTAL	**84**	**150 farmers**

This meant that of a total of 150 (target population) farmers, 84 farmers (sample size) were identified to be interviewed. As explained in the following Sections, all 84 farmers attended the structured interviews and completed the interview schedule. The fact that all members of the sample (84) decided that they do need a telecentre may be the end-result of the various Actions of the four-phase participatory process. These Actions included the incorporation of the preceding Actions (incorporation of the NPFA and the expression of a need for a telecentre), based on the participatory bottom-up approach which included all their suggests, remarks, questions and ideas in the decision making processes.

The total sample (84) decided that they do need a telecentre at their irrigation scheme and the Standard Deviation was eventually a 10%. The minimum sample size of 48 farmers (Chapter 4, Section 4.2.7) was exceeded because the eventual sample size was 84 farmers, which produced a higher level of representivity.

It is here, though interesting and important to note the lay-out of the total Thabina irrigation scheme al

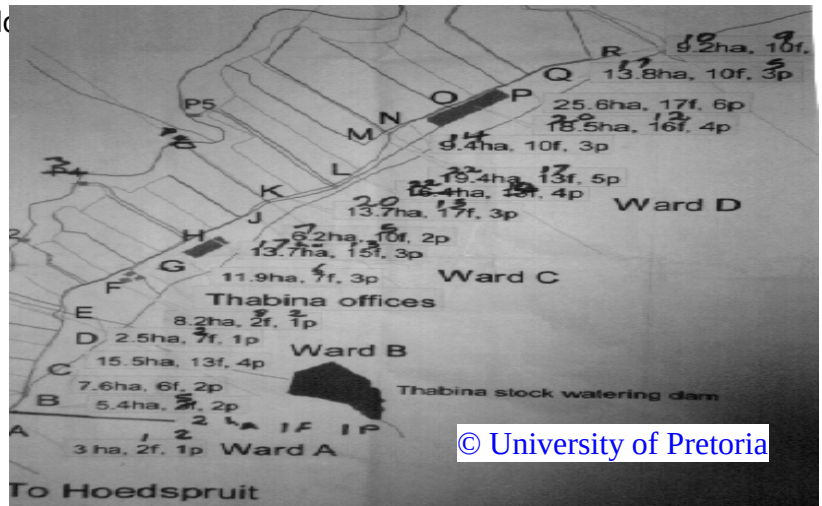


Photo 6.1: Plots are divided into Wards along the Thabina River

Answers to questions such as Question 13 which contained different categories, were presented by MSSA in separate tables. These responses, such as Question 13 (f to h) were then combined by the researcher in one graph, since it was the different responses linked to the same question.

The background is explained above regarding the lay-out and set-up of the irrigation scheme with its farmers. To follow is Sub-sections with discussions and explanations of the structured interview.

6.4.2.1 The interview schedule for the structured interview

The purpose of the interview schedule was to research and analyse the emotional world of the small-scale irrigation farmers by means of gathering demographic information, information on the socio-economic needs of the farmers and their opinion on the information and communication technologies (ICT needs) which they consider could address their needs. According to these needs, applicable information and communication technologies could be identified that could address these needs, as well as the agriculture-related information needs analysed previously in Phase 1. Data collection methods during the structured interviews were the completion of interview schedules, participatory observation and field-notes.

The draft interview schedule, prepared by the researcher, was compiled with the specific circumstances of the farmers in the rural agricultural community of Thabina in mind. The interview schedule was discussed with and approved of by the Management Committee, the Vice-Chairman and the Extension Officer at the same meeting where the notes on the management of a telecentre were discussed (Section 6.2). These discussions took place in the office that would become the telecentre. The interview schedule was discussed with the Chairman and the Vice-Chairman in order to obtain their approval for the farmers to leave their farming activities to be able to attend the structured interviews to complete the interview schedules. The input of the Extension Officer was to ensure that the relevant socio-economic needs of the farmers of the Thabina irrigation scheme would form the outline of the interview schedule. Their suggestions and recommendations were incorporated in the final interview schedule (Appendix F). The outcome of the results, findings and interpretations of the interview schedule was presented to the Management Committee and discussed.

Although both the Chairman and the Vice-Chairman did not have a problem with the farmers completing the interview schedules, they suggested that the completion of the interview schedules

"should not start before 10:00, as the farmers had to irrigate their land before they could come to the hall to complete the interview schedules". This hall was adjacent to the telecentre, which would have been too small to accommodate the farmers.

The Chairman also suggested that not only the core words, but the "full interview schedule be translated into Tsonga, the local language". The researcher accepted this, and mentioned that she could make use of UNISA to do the translations. As many of the farmers were illiterate, the researcher suggested that they had to answer the interview schedules by merely "drawing a circle around the answers". After participatory discussions on who should explain the questions, it was decided to ask some of the extension officers to do this, as they know everything about farming in the area and they understood the language. The researcher also suggested that there should be sketches drawn on flip charts to explain the questions. After these participatory discussions on the basic and important aspects around the structured interviews, participant observation showed that both the Chairman and the Vice-Chairman felt at ease with the arrangements and that the interview schedule, could be discussed.

The interview schedule was discussed and after considerations and deliberations during which both the suggestions of the Chairman, the Vice-Chairman and the Extension Officer were noted in field-notes, the interview schedule was finalised and approved of by the researcher as well as both the Chairman and the Vice-chairman of the Management Committee.

During the feedback session where field-notes on the interview schedule were discussed, dates were set for the structured interviews in group session during which the farmers would complete the interview schedules: 13 March 2004 for Ward C, 14 March 2004 for Ward A, 27 March 2004 for Ward B and March 2004 for Ward D.

This Sub-section explained the various participatory meetings where discussions and deliberations were held in order to compile an interview schedule according to which the socio-economic and ICT needs of the farmers could be determined: The identification of the survey population, deliberations and discussions regarding the compilation and finalising of the interview schedule were explained. After discussing these aspects, the important matters and issues around the interview schedule, will be addressed in the next Sub-section. These include the process followed for the completion of the interview schedules and the discussions on the compilation and approval of the interview schedule as such, including the role of the translators and the sketches.

6.4.2.2 Structured interviews

In the following Sub-sections the matters and arguments related to the structured interview are discussed and explained.

6.4.2.2.1 Process followed during the structured interviews

The process followed during which the farmers completed the interview schedules is discussed in this Section. This entails the background; the opening of each structured interview during which the interview schedules were completed; the atmosphere during these structured interviews; the cooperation of the farmers and the Extension Officers; how the interview schedules were explained; and the actual interview schedule with special reference to the comments of the farmers on the sketches that supported some questions.

The attendance of the farmers, according to the sample drawn, was 100% for all four Wards. The sketch explaining the various information and communication technologies was extremely helpful in explaining this Western concept to farmers from the developing world. An explanatory note regarding the lunches offered by the Women's Forum is given in Box 6.1 Below.

As it was foreseen that each session would last a day, lunch was prepared by the Women's Forum. Some sessions, though, lasted only for a morning, after which lunch was served earlier. For gender equity, it was necessary to include these women, as they would also make use of the telecentre, as mothers with children. Three of them were also farmers (research participants), who took terms either to cook or attend the interviews

The ARC sponsored the lunches and the researcher bought the ingredients. All four lunches consisted of "pap-en-vleis", the traditional meal of the black people in South Africa. The Women's Forum was remunerated R5 for each attending farmer. The aim of asking them to prepare lunch, was to incorporate the women of the community.

Box 6.1. Background on the women's Forum for preparing lunches

Source: Researcher's participatory observation and field notes

Opening of each structured interview conducted in the group situation

A ritual was followed before each of the structured interviews, which is explained in Box 6.2 below.

Each session was opened with a prayer by one of the attending farmers. The researcher then introduced herself and the driver who worked with her and who helped her to put up the sketches and the flip chart. The researcher then thanked the Women's Forum for their time in preparing the lunch and handed the secretary the remuneration. She also thanked the farmers for attending the sessions, as they were known to be busy farming during the day – especially in the morning when they irrigate and that they also had a long way to walk to the centre where the sessions were held. All farmers clapped their hands in appreciation to thank the Women's Forum, after which the farmers sang a "happy song". This contributed to a relaxed atmosphere, bridging to gap between the local culture and a western culture – the concept of completing interview schedules.

Box 6.2. Ritual followed to open each semi-structured interview

Source: Researcher's participatory observation and field notes

This Section described the process followed during which the structured interviews were conducted and which entailed the opening, lunch preparations and ritual followed. This process proved to be suitable and acceptable to the farmers, as all the farmers as research participants joined in the various activities, and they also expressed their appreciation for all the arrangements made on their behalf. After explaining the process followed for conducting the structured interviews, the process that was followed for completing the interview schedules as such, is discussed and described in the next Section.

6.4.2.2.2 The process followed for completing the interview schedules

This Section discusses the course of events and participatory discussions during the completion of the interview schedules. The interview schedules were completed by the identified research participants (farmers). The Extension Officers supported the farmers in completing the interview schedules, and gave each and every farmer individual attention when needed.

The researcher explained the purpose of the structured interviews and accentuated the fact that the telecentre would "belong to them, the farmers of Thabina". Therefore it was important to ask them their opinions as part of the participatory process – "what kind of information do you want"; "what information the 'machines' could supply you with"; "who should use the telecentre", etc.

After these explanations before the farmers completed the interview schedule, the researcher then explained the completion of the interview schedules: To answer the close ended questions, they only had to draw a circle around the answer selected. The researcher would note the respondents' answers to open-ended questions on the flip charts. There were a few questions that they had to complete themselves – such as their name and Ward.

The whole interview schedule was written on flip charts, which made it easy to demonstrate how the questions should be answered. The interview schedule was presented on the flip charts in Tsonga, the indigenous language. The researcher read the specific question in English from her notes, indicating the specific question on the flip chart by pointing to the question on the flip chart and explaining how it should it be answered (open-ended or close-ended with only a circle around the answer). The translator read the same question from the flip chart, written in the indigenous language and presented the same explanation for answering the question in the local language to the farmers. Sketches supported the questions where the research participants did not understand the Tsonga, as some were Sotho, or where they were illiterate. These aspects will be discussed in the next Section.

6.4.2.2.3 Flip charts and sketches to support and describe the questions

Flip charts: The questions on the flip charts were written in Tsonga with room for the answers to open-ended questions. The researcher completed these open-ended questions with answers

obtained from the respondents, in order to accommodate the indigenous language: According to PM&E the researcher did not direct or guide the research participants to a specific answer. With open-ended questions, all answers were indicated on the interview schedule or on the flip charts, should there be more than one answer to a question.

Sketches: The sketch of the various information and communication technologies in particular contributed enormously to explaining this First World concept to farmers of the developing World, especially the illiterate farmers. These sketches enhanced the understanding of questions 12 and 13 in particular.

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Photo 6.2: Sketches accompanied most questions to allow for illiteracy

These sketches were drawn by a then colleague of the researcher. The aim of the sketches was to assist with the meaning of the questions. With most questions linked to a sketch, the opinion of the farmers of what they understood from the sketch was asked and noted simultaneously. This was a very interesting exercise, as the farmers sometimes saw something totally different to the intended meaning.

The researcher then read each question in English and explained it, pointing to the relevant sketch. The Extension Officers then translated her explanation into Tsonga and Sotho, the local languages for the illiterate farmers who could not read the questions on the flip charts. These two extension officers also assisted the illiterate farmers in completing the questions the respondents had to complete themselves such as the demographic information.

After each structured interview, the researcher once again thanked the farmers for their time, as well as the extension officers for helping to translate and complete the interview schedules. A

spokesperson for each Ward then thanked the researcher for helping them to establish the telecentre, as they recognised that they needed information on a huge variety of farming as well as socio-economic and ICT aspects. Afterwards the Women's Forum served the lunch.

6.4.2.2.4 Field-notes of Action 2: Completion of the Interview schedule

Field-notes compiled during the participatory discussions with the Management Committee during and after the structured interviews during feedback sessions comprised the following:

- The information gathered through these interviews assisted me in identifying the information and communication technologies that could address these socio-economic and ICT needs. The information and communication technologies identified were compared to those identified for addressing the agriculture-related needs in collaboration with the Management Committee. Appropriate, affordable information and communication technologies would then be identified and bought. Several participants also noted their need for newspapers, and the DAFF as well as *NuFarmer* newspapers would be contacted to deliver to the telecentre for free. The need expressed for a clinic also lead to the inoculation of all the children as well as lectures on HIV/Aid, family planning and child nutrition by the nearest clinic which was in a nearby town.
- It was much faster to complete interview schedules personally with the respondents, because questions were clarified and answers that were unclear or incomplete were followed up.
- The farmers, as respondents, also would not have to be literate, as the questions were explained to the respondents in the local language by the extension officer, and also because the respondents mostly had only to draw a circle around the chosen answer.
- I wrote all core words of the interview schedule in Tsonga, the local language, on flip charts for explanatory purposes. A reputable translator was used for the translations.
- The farmers, as respondents, completed the interview schedules as they only had to draw a circle around the answers selected in response to the close-ended questions, but I would complete the open-ended questions by writing the answers on the flip-charts. I explained that they had several choices to circle in the multiple questions.
- In this research process a large number of respondents were used to complete the interview schedules, because a representative sample was taken from each Ward where the farmers live.
- The interview schedule on the socio-economic and ICT needs of the farmers had open-ended questions such as "what other information do you need?" and "what newspapers do you read?" etc. With the first interview schedule on the socio-economic and ICT

needs, translators explained the questions to the recipients. It was in some cases necessary to edit the data collected in the interview schedule on socio-economic and ICT needs, as it was clear that sometimes the recipients did not understand the question properly, and had completed a wrong answer to the question – an answer that would belong to another question, or sometimes an answer to a question that was not asked.

The processes followed during the structured interviews and for completing the interview schedule with the support of translators, flip charts and sketches proved to be successful as the interview schedules were mostly completed in full. After these structured interviews for completing the interview schedules, the interview schedules are discussed and explained. The actual interview schedule and the farmers' interpretations of the sketches are discussed in the next Section.

6.4.2.2.5 Participatory discussions explaining the interview schedule and identifying ICT

Participatory discussions on the interview schedule are presented in this Section. Special reference is given to the perceptions of the sketches expressed by the farmers. To note is that the questions in the interview schedule were very short, because they had to be explained further by the Extension Officers. These socio-economic and ICT needs to be addressed in the interview schedule were identified in collaboration with the Management Committee and are therefore the socio-economic and ICT needs applicable to the farmers of the Thabina irrigation scheme as such. The Management Committee was satisfied that all important needs of the farmers are addressed. The interview schedule as a whole can be seen in Appendix F.

The interview schedule (Appendix F) contained two categories: (I) Demographic information of the farmers and (II) Current exposure to ICT of the farmers with reference to social needs such as books, newspapers, radio and television.

- **(I) Demographic information**

Question

1 **Name?** The name of the respondent was important to the Chairman and the Vice-chairman. They suggested that "the farmers should complete their names", as all farmers were "known to us and we would like to see which farmers would use the telecentre".

2 **Ward?** The Ward of the plot of the respondent was important to Chairman and the Vice-chairman. Some of the Wards were very far from the hall where the farmers completed the interview schedules, and Chairman and the Vice-chairman wanted to see "how many of those far from the hall will attend". This would give an idea of how important they thought the telecentre was.

3 **Income: Part time or full time?** It was important to the researcher to know if the respondent farmed part time or full time, in order to note whether s/he had income other than from farming.

4 **Do you have a full time/part time job other than farming?** This question was important to the Vice-chairman, because if the respondent also had an “additional income”, the farmer could use the information and communication technologies also for “purposes other than farming such as work-related management documents, private correspondence, CVs”, etc.

The farmers saw a "man sitting behind table at work".

Photo 6.3: Question 4

5 **Other family members?** It was important for the researcher to obtain information on other family members, who could also be potential users of the telecentre. These could be children of varying ages from children undergoing tertiary training to infants and it was important to note if the telecentre could address their needs.

6 **Residence?** It was important to analyse whether the respondent would be able to make use of the telecentre – based on where the respondent lived in relation to the telecentre which would make it more or less accessible.

7 **Age:** Obtaining an age profile of the respondents could be an important barometer of usage – older respondents might be technophobic, while younger respondents might be more inclined to use the telecentre.

8 **Gender:** As there are many female farmers, it was important to note whether they would use the telecentre for other purposes than farming – such as tele-medicine, etc.

The farmers saw a "happy man and a happy woman". They started informing me on their arts and crafts they produce themselves (such as necklaces and belts made from beads and leather).

Photo 6.4: Question 8

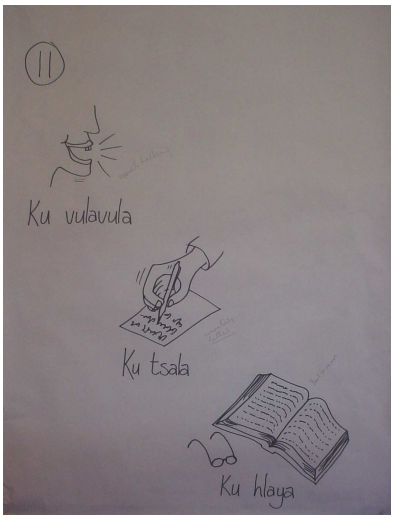
9 **Marital status:** It was foreseen that this Question could pose a problem, as this question could prove to be of little consequence, because marriage was not prerequisite to having children, a man could have more than one wife, or children with more than one woman without being married.

10 **Education:** The literacy aspect was important to the researcher, as sessions from the school or technikon might be arranged.

The farmers saw a "certificate for something you have achieved".

Photo 6.5: Question 10

11 **Functionally literate:** The respondent's potential to read, write and speak English was an important measurement, as English is the language of the technology.



The farmers understood a "mouth talking, a hand writing a letter and a book to read". Some farmers, though, asked whether the book could only be read with "spectacles".

Photo 6.6: Question 11

- **(II) Current exposure to ICT (information and communication technologies)**

The following questions were important to the research, and the researcher had to explain the questions briefly to the Chairman and the Vice-chairman.

12 **What is the availability of and your exposure to ICT?:** It was important to establish whether the respondents had any exposure to ICT at that stage. A list of ICT was given and the respondent had to choose the specific ICT of which s/he had had exposure (multiple). The Vice-Chairman of the Management Committee owned a computer and the researcher had to explain the aspects such as the modem, of which the rest of the Management Committee was unfamiliar with.

13 **Your need for ICT?:** It was important to note for what purpose the respondent needed the ICT. The question was presented in a tabular format. The Management Committee suggested the categories, as they saw these categories as the most important socio-economic and ICT categories which had to be addressed. The answers were structured so that the respondent only had to draw a circle around the specific ICT s/he needed, in the relevant column (social, doctor, security, etc.)(multiple).

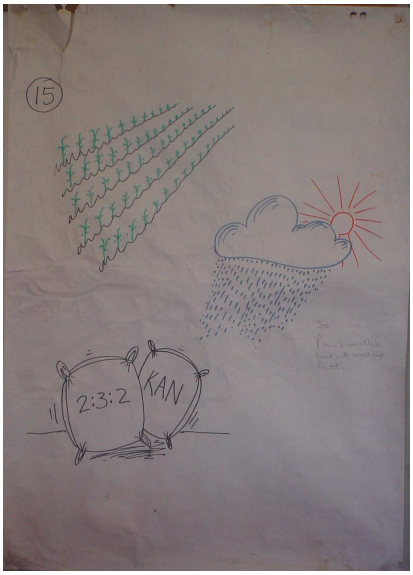
14 **Would you be interested in an office (telecentre) with these information and communication technologies?:** The word 'telecentre' was unfamiliar and strange to the farmers, therefore the term 'office' was used. Although the Management Committee did say that they would like to have a telecentre established, it was necessary to obtain each farmer's opinion. This could indicate how much the telecentre would be used.

14.1 **Would you use the ICT at a nominal fee?:** It was necessary to ask the respondent if s/he would pay a nominal fee for the usage of the ICT. Whether they would be willing to pay a nominal fee, would have a direct influence on the viability of the telecentre.

The farmers understood the sketch as "hofisi" was written on the door, meaning "office". This may also be due to the fact that before the completion of the interview schedules, I explained that the interview schedules would be regarding the telecentre, as well as the fact that this concept was explained to them as "an office with these machines".

Photo 6.7: Question 14

14.2 May people from outside the Thabina Irrigation Scheme use the office and what are the conditions thereof?: The Vice-Chairman felt that this question was most important, as this would reflect the farmers' opinions. The Vice-Chairman felt that the surrounding communities should make use of the telecentre, as it would "bring in more money". It was important to note whether the respondents would be willing to let neighbouring communities use their telecentre, as this would greatly influence the monthly income of the telecentre – the more users, the more money would be generated. It was also important to note the conditions suggested, as these would have to be incorporated into the daily management of the telecentre. The conditions for using the telecentre were established through an open-ended question.



The farmers saw land with small crops growing. Some thought it might be "cattle feed". They saw rain and weather. They saw fertilizers, as they were familiar with 2:3:2 and KAN.

Photo 6.8: Question 15

15 What kind of information do you need?: It was important to note what information the respondents would like to obtain.

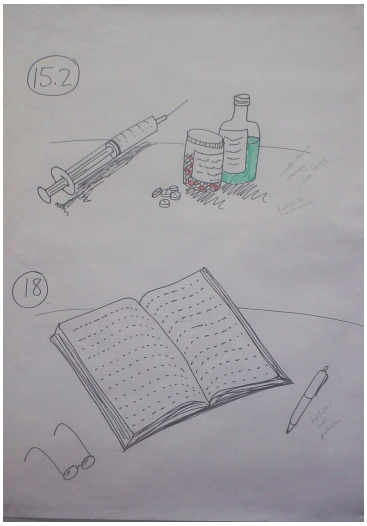
15.1 Farming: The researcher gave examples of various farming aspects like pesticides and fungicides from which selections could be made. The respondents could also mention the kind of information they considered pertinent. The Extension Officer provided most of the categories. The respondents could also mention the kind of information they considered pertinent.

15.2 Other information needed: The respondents could choose from several options on which they needed information on socio-economic such as health care, education, social, etc. (multiple). The Management Committee suggested most of the categories as they were aware of the socio-economic needs of the farmers.

16 What else would you like to obtain/send information about?: This was important to note, as there might be other aspects the respondent would like information on. The Management Committee requested this open question in case all the categories of needs were not covered.

17 Which information do you need or would you like to send most?: This was important, as the researcher and the Management Committee felt that, although agriculture-related categories as well as socio-economic and ICT categories were presented, there might be other information that could be needed by the farmers. This was also an open question suggested by the Management Committee, as we had a brochure (Appendix I) in mind, and they wanted to obtain information on what information the farmers wanted to disseminate most.

18 If you can not read or write, would you like to learn to do this?: This was important to note, as reading and writing classes could also be arranged at the nearby college should the respondent want to learn to read or write.



The farmers understood "a book, a ball pen and spectacles";
The injection needle looked like a "injection from a veterinary" – due to its size in comparison to the tablets. Further they saw tablets and medicine.

Photo 6.9: Question 18

19 **Would you like to learn another language?:** It was important to note which respondents would like to learn another language, as language classes could be arranged at the nearby college.

20 **What information would you like to give to people outside your community?:** This was important, because this would mean that other information than farming could be sent via fax. These categories were seen by the Management Committee as important to note, as it could be included in the brochure (Appendix I). This was also an open-ended question, the answers to which were written on the flip-chart.

21 **Do you do business at several places?:** It was important to note whether the respondent trades products only with people in his/her community or elsewhere. Should it be elsewhere, those people had to be informed of the farmer's products.

The farmers saw "road signs";
They saw a "cancelled phone" as well as a question mark and asked "why was our telephone cancelled". Some women replied that maybe the telephone was broken, as they saw the red cross as "plaster". The red cross meant that the object, like the telephone here, was not available to them.

Photo 6.10: Question 21 and 22

22 **If you do not have a telephone, why don't you have one?:** It was important to note whether the respondent had a telephone or not as well as the reason for this, as it would be available to him/her at the telecentre. Should there be a reasonable, or fair number, of farmers that would make use of a telephone but could not afford it, more telephones should be installed at the telecentre. The Vice-chairman was not sure whether this question was applicable, as he felt that the farmers had no money to buy books or magazines any way. But the researcher explained that she could obtain books and pamphlets from the Directorate of Communication at the National Department of Agriculture, as well as from the Agricultural Research Council, free of charge in order to establish a small library.

23 **Do you read books/magazines?:** Should the respondent be interested in book/magazines but did not have access to them, such publications could be subscribed to – for the library at the

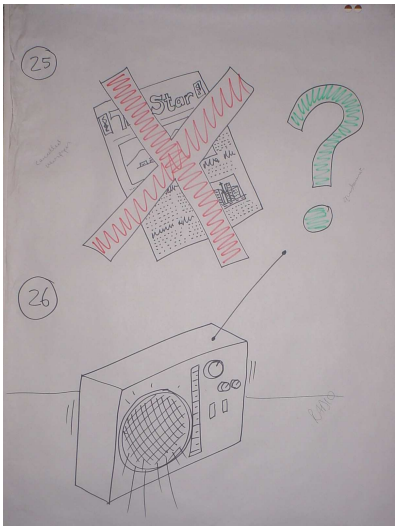
telecentre, as discussed with the Management Committee. The Vice-chairman was not sure whether this question was applicable, as he felt that the farmers had no money to buy books or magazines any way. But the researcher explained that she could obtain books and pamphlets from the Directorate of Communication at the National Department of Agriculture, as well as from the Agricultural Research Council, free of charge in order to start a small library.

All the farmers understood that it was books to read;
All the farmers understood that it was newspapers. This could also be due to the fact that most could read the letterheads of the newspapers (*Sowetan, The Star).*

Photo 6.11: Question 23 and 24

24 Which newspapers do you read?: Should the respondent be interested in newspapers, this could also be subscribed to by the telecentre and placed in the library at the telecentre.

25 If you do not read newspapers, why not?: It was important to note **why** the respondent do not read newspapers. Should the farmers not be interested in reading newspapers, the telecentre should not subscribe to newspapers. Should the reason be that the respondent could not read, language classes could be considered as mentioned in Question 19.

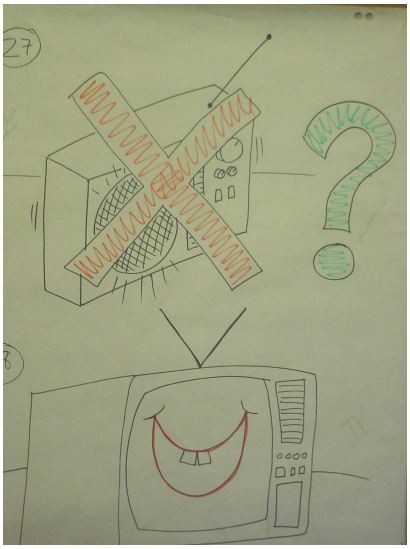


By now the farmers knew that the red cross implied 'not available' and they interpreted the sketch as "not available newspapers". Some women though still thought that the red cross meant plaster, and that "the newspapers might be broken or stopped or something".
All could see that this was a radio, which most of them possessed.

Photo 6.12: Question 25 & 26

26 **Do you listen to the radio?:** This question was asked in order to determine how many respondents have access to ICT such as a radio.

27 **If you don't listen to the radio, why not?:** It was important to note the reason why they do not listen to the radio. Should it be a lack of electricity, the installation of electricity could become an option. The categories for this close ended question was also presented by the Management Committee as they knew the problems of the farmers regarding this category, because they have received several complaints regarding this matter.



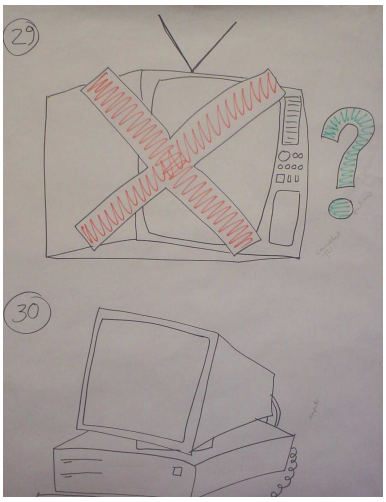
All agreed that this was a "cancelled radio", though some women insisted that it looked like a "broken radio". The question mark was understood immediately;
All understood this as a television set with "friendly programmes".

Photo 6.13: Question 27 and 28

28 **Do you watch TV?:** This question was asked in order to determine how many respondents have access to ICT such as a TV.

29 **If you do not watch TV, why?:** Should it be a lack of electricity, the installation of electricity could become an option.

30 **What would you use the computer for?:** It was important to note what the respondent would use the computer ("machine", as it was called by the farmers) for. If necessary, the farmers should be trained in the various uses of the ICT.



Most of them understood that this was "the machine they are going to have in the office" – the computer in the telecentre.

Photo 6.14: Question 29 and 30

31 Other types of information needed?: This open ended question was seen as important by the Management Committee, as the meeting felt that the answers would indicate the socio-economic and ICT needs as well. Should there be any other social need not covered in another question, it could be mentioned here.

32 Do you have to travel to other communities for access to ICT?: It was important to note whether the respondent had to travel to another village/town/city for access to ICT. Should the farmer have to travel, he might rather decide to use the telecentre, which would be nearer. Should the answer be a **'Yes'**, the following questions would be relevant. The Vice-Chairman thought this question was important as he knew that the farmers had to travel to surrounding villages to have access to a computer and to do printing or to send faxes.

33 Name of village/town/city?: It was important to note the name of the village/town/city, where ICT was available, in order to determine how far it is from Thabina.

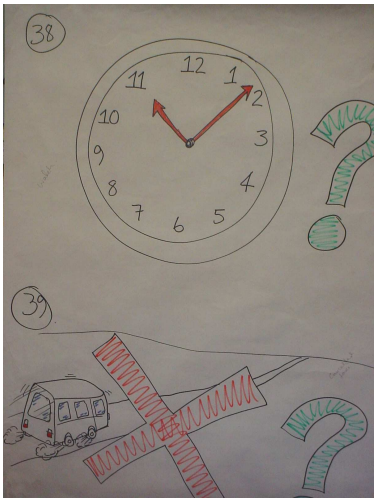
34 Means of transport?: This was important to note, concerning how convenient it was to reach the village/town/city. Accessing the local telecentre could be easier, as it would be on the premises of the offices of the WUA.

35 Distance?: It was important to note the distance the respondent had to travel in order to have access to ICT. The telecentre would be much nearer – depending on the location of the plot (Ward).

36 Time required one way?: The question was formulated to calculate the distance between the plot of the respondent and the place where the respondent had access to ICT.

37 Cost of transport?: It was important to calculate travelling costs to enable the respondent to have access to ICT, as these costs could be saved by using the local telecentre.

38 Average time away on trips?: It was important to calculate the time that could be saved by the respondent when making use of the telecentre – they were all farmers, with little time at their disposal for travel for purposes other than farming.



This looked like a cancelled taxi to them, and they were worried, as they though that the taxi service might be cancelled. Some women again indicated that it looked like a "broken taxi".

Photo 6.15: Question 38 and 39

39 Less travelling when using a telecentre?: If the answer was in the affirmative, the respondent would rather make use of the telecentre, than travel further in order to reach information and communication technologies at another location.

6.4.2.2.6 Field-notes of Action 2: Determining the socio-economic and ICT needs of the farmers

- The Management Committee suggested many questions that comprised current difficulties and problems of the farmers. There could therefore be an indication that the needs of the farmers have not changed since the identification of the NPFA. This was to be seen with the outcome of the interview schedule.
- Although an interview schedule is a concept of the developed world, the completion of the interview schedules took place in a relaxed atmosphere. Contributing to the relaxed atmosphere were aspects such as the singing of the “happy song” during the opening of each structured interview; the opening of each structured interview with a prayer; and the fact that the structured interviews took place in the Training Centre which was familiar to the farmers. Some women also brought their children along who played, sang and sometimes cried throughout the structured interviews and some of the farmers’ dogs also followed them into the meeting. The farmers also showed appreciation for the fact that they could keep the pens, which were supplied to complete the interview schedules – on hearing this, they even clapped their hands. This relaxed atmosphere also showed that the telecentre could be used as a hub where people gathered to exchange information. The many questions asked by the farmers in the indigenous language were addressed by the Extension Officers who assisted the farmers in completing the interview schedule. All farmers selected for the sample attended, which showed their willingness to participate in the establishment of the telecentre. Their body language also showed that they were eager to learn more about information and communication technologies and a telecentre. The assistance of the extension officers from

other regions than Thabina (such as Berlin) in completing the interview schedules was also of great help. An interesting example of cooperation was the fact that, during the structured interview with ward B, a blind farmer arrived at 12:00. After apologizing for being late, he stated very clearly that he "also want to know about the 'machines' (technologies), and "I also wanted to learn how to operate them!".

- Many farmers did not know either their own or their children's ages, in which case the year of birth was filled in. Uneasiness was noted with question 14.1 where they had to complete whether they would use the information and communication technologies at a small cost. I therefore explained to the farmers that the telecentre would need an income. With this income the telecentre would have to buy paper and ink, keep the information and communication technologies in good working order, and pay the electricity and the telephone (which would be used for the fax) bills. This put the farmers at ease, and they all agreed to pay a nominal fee for using the information and communication technologies. A developing world concept such as not getting married but having children, also had to be removed (question 9). This was a suggestion from one of the farmers, but all agreed that this is not true.
- It should be noted that it was quite clear from the answer to question 14.2 that the farmers of Wards A and C did not want anybody from outside Thabina to use their telecentre. This came as a surprise to me, as I had explained that this could contribute to a higher usage of the information and communication technologies, meaning a larger income for the telecentre. Farmers from Wards B and D, though, felt differently. They wanted people from outside Thabina to use the telecentre, as they felt this would "bring in more money". This was on condition however, that these people should be charged more for using the "machines". After participatory discussions with farmers of all Wards, it was decided that the surrounding communities could use the information and communication technologies at higher prices.
- People from a developing community need time to make decisions. During the interviews where documents were compiled as well as the structured interviews where interview schedules were completed, the attendees would neither agree nor disagree with an aspect. They had to discuss it among themselves in their local language, think it over and then present their opinion. They really needed time, especially in a situation concerning development, where they are subjected to messages that could have a huge impact on their lives and could lead to fundamental changes. This was part of their culture – they had to have participatory discussions among themselves before being able to make a decision.

This Section described how the socio-economic and ICT needs of the farmers as well as their opinions regarding information and communication technologies were identified. The participatory discussions on the structured interviews, conducted by means of an interview schedule were

discussed. The field-notes taken revealed some important characteristics, viewpoints and expressions of the farmers as respondents, because they came in contact with a modern and unknown aspect such as to complete an interview schedule – they haven't had experience before. After completing these various activities and proceedings, it would be necessary to identify and indicate which of the practices it comprised, could be seen as important. In the next Sub-section, those Actions of this Phase that could be seen as good practice, are discussed.

- **Good practice found during evaluations**
    - It was good practice to translate the interview schedule into Tsonga. This made it much easier for both Extension Officers to understand the questions. They did the translations of the questions into Sotho, the other local language. This is also distinctive of the Ethnographic Approach – the fact that an important part of the indigenous culture, in this case the language, be taken into consideration in the development process.
    - It was also good practice to start the interview schedule with easy demographic questions such as name, Ward and plot number. It could also be seen as good practice that the farmers just had to draw a circle around the answer chosen. Questions with multiple answers, such as 5.2, were treated in a special way. Firstly the names of the children had to be listed, then the age, school grade and lastly the employment categories such as whether they have a job other than farming.
    - Answers to question 20 which referred to other information they wanted to disseminate, surprisingly also included answers such as "our arts and crafts". Many farmers were also interested in obtaining "information from over the sea" – although they had never before heard of the Internet.
    - These structured interviews could be regarded as successful. They also served as a measurement instrument. This was planned with specific questions and objectives and more detailed information could be obtained. The researcher gathered that all respondents were eager to complete the interview schedule.
    - Various emotions were observed. The farmers were delighted with the establishment of a telecentre at their WUA, many of them ''learning about this things for the first time''.
    - Although the consent of the Management Committee to establish a telecentre at the Thabina WUA had already been obtained (Appendix E), it was obvious that many of the farmers had not heard about this concept before. The farmers' positive attitudes could be due to the fact that they were involved in all decision-making processes towards the: Establishment of a telecentre; their opinions on their social needs; opinions regarding the way the telecentre should be managed; and who could and could not use it, were most important. This meant that they recognised the concept of the information and

communication technologies and its role in transforming information into knowledge, which in turn leads to development.

- The best practice is to make ample, if not extensive, time for communication and negotiation, as full participation and involvement take time. This became clear in the participatory discussions on the project plan and the document on managing the telecentre.
- It can also be seen as good practice to explain the different aspects in a very simple and comprehensible way to the recipients. It must be simple enough, but also sophisticated enough for the communicator not to be seen as underestimating the intelligence of the translator or, for that matter, that of the recipients.

In this Section Action 2 was discussed and explained: The interview schedule with field notes was explained and discussed with the Management Committee, who gave their consent that these questions are related and linked to the socio-economic and ICT needs of the farmers of the Thabina irrigation scheme as such. The actual completion of the interview schedule was explained with reference to how the sketches, supporting the questions, were interpreted by the respondents. This important Action on the identification of the socio-economic and ICT needs of the farmers and their opinion regarding the informant and communication technologies was discussed with the Management Committee in order for them to understand the opinions and considerations of the farmers of Thabina and to realise the situation and circumstances regarding these needs of the farmers.

In the next Section, Action 3, the participatory discussions regarding the outcome of the interview schedule and the decisions taken on the identification of applicable information and communication technologies to address the needs of the farmers of the Thabina irrigation scheme are explained.

6.4.3 PARTICIPATORY DISCUSSIONS AND EXPLANATIONS REGARDING THE OUTCOME OF THE INTERVIEW SCHEDULE AND IDENTIFYING ICT: Action 3

- In questions where more that one option is available per respondent, the outcome of the question will be presented in a bar chart since the results will add up to more than the number of the respondents as well as percentages. Consequently the bar charts represent the number of responses per question and are not presented as percentages (%), as with the pie charts. Important to note is that the number of responses will therefore exceed the number of respondents.
- The n value, 84 is indicated in all the questions.
- The number of respondents that did not respond to questions is represented under ‘system missing’, with the explanation therefore in brackets.

Question 1: Name?

The names of the respondents were important to the Chairman and the Vice-chairman. They suggested that "the farmers should complete their names", as all farmers were "known to us and we would like to see which farmers would use the telecentre"**.**

RESULTS:

Since there were 84 respondents completing the interview schedule, the Management Committee would "look at the interpretations of the individual farmers at a later stage". This was due to time restrictions because they wanted to analyse each farmers' answers, needs and problems. The researcher agreed, as the information on the names did not influence the outcome of the interview schedule. It is also important to note that although the names of the respondents formed part of the questionnaire, the researcher kept the names confidential and no respondent was identified in the rest of the analysis in accordance with the University of Pretoria ethical clearance policy.

Question 2: Ward?

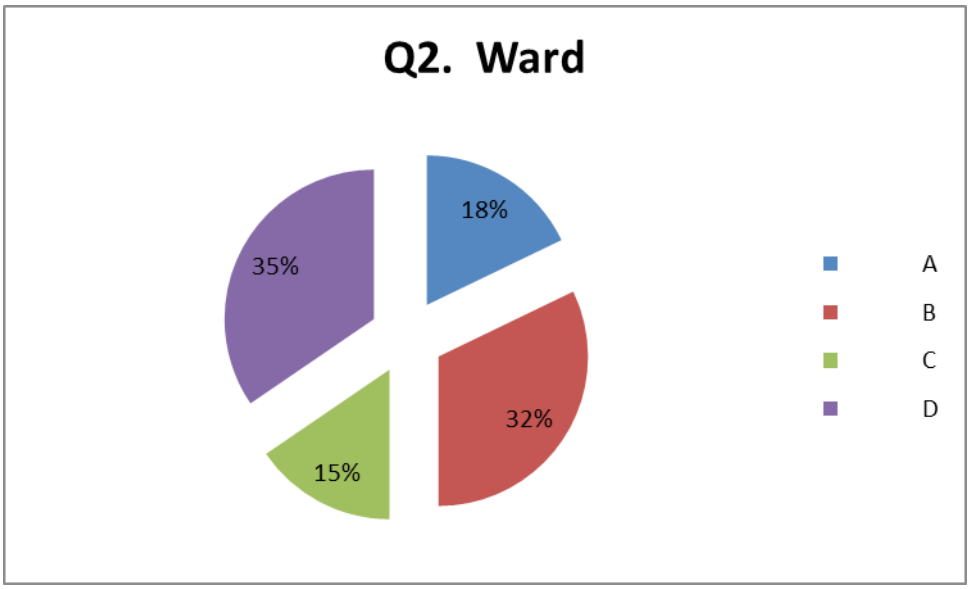
The Wards of the plots of the respondents were important to Chairman and the Vice-chairman. Some of the Wards were very far from the hall where the farmers completed the interview schedules, and Chairman and the Vice-chairman wanted to see "how many of those far from the hall will attend". This would give an idea of how important they thought the telecentre was.

Table 6.1: Question 2

Q2. Ward		
	Frequency	**Percent**
A	15	17.9
B	27	32.1
C	13	15.5
D	29	34.5
Total	84	100
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.2 Question 2



Source: Researcher's calculation of question

RESULTS:

The outcome indicated that the various Wards, Wards A, B, C, D were represented fully, as all respondents attended each meeting to complete the interview schedules, in spite of the fact that some Wards were quite a distance form the hall and that they had to walk to the hall, after irrigating early morning. This was a positive indication that all the farmers representing the Wards, were eager to learn more about the telecentre and also to voice their opinions regarding their socio-economic needs as well as their agriculture-related needs.

Question 3: Income: Part time or full time? (farming)

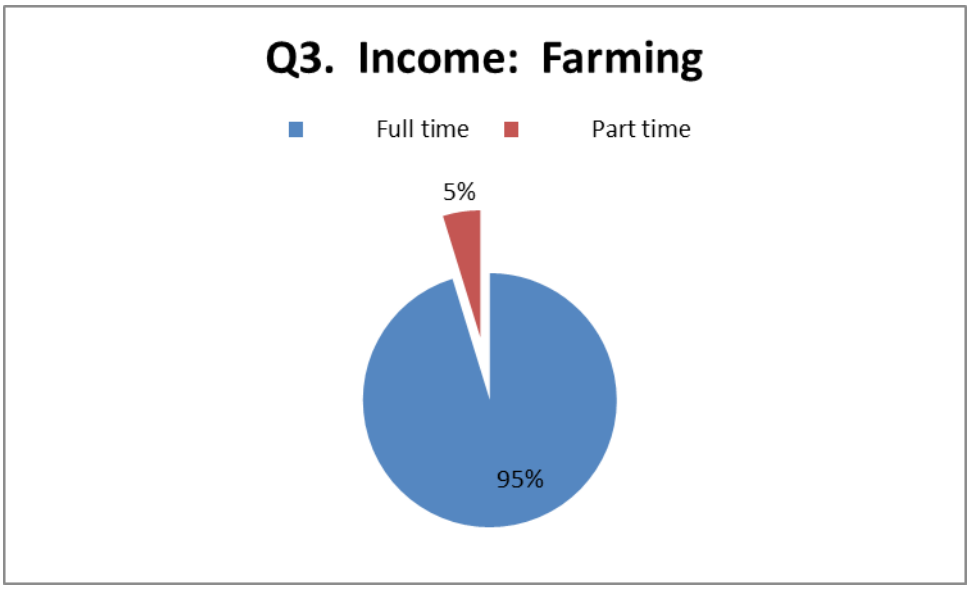
It was important to note whether the farmer is a full-time farmer and whether the farmer had other income as well.

Table 6.2: Question 3

Q3. Income: Farming		
	Frequency	**Percent**
Full time	80	95.2
Part time	4	4.8
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.3. Question 3



Source: Researcher's calculation of question

RESULTS:

The outcome indicated that 95% of the farmers receive their income solely from farming. It was therefore vital for the farmers to obtain agriculture-related information on their farming practices.

APPLICATION:

Since the farmers still awaited the promised RESIS Program of the NPDALE which would include refurbishment of the canal and catchment area of the canal, the farmers decided that a letter should be written to the DWA. This resulted in a letter from the Chairman, during 2007, presented to the researcher, in order to submit the letter to the DWA (Appendix P) which led to the refurbishment of the infrastructure which entailed the repair to the weir and the distribution canal, although the loss of a reliable water resource could not be rectified, as explained in Chapter 9 in Section 9.3.1. Since the respondents were all farmers, it also proved that the information they need the most was agriculture-related aspects such as contributions to the WUA, markets and farming information (outcome of Question 17: Which information do you need or would you like to send most?). This also resulted in the subscription to the newspaper *NuFarmer* and the *DAFFNews* as explained in Chapter 7 in Section 7.7 on the establishment of the library. The farmers would make good use of the library and various articles were copied and also translated by the secretary into the indigenous languages of the farmers. Most farmers also felt that they will obtain sufficient agriculture-related information from the information and communication technologies, as was proved and confirmed as described in the explanation in Chapter 9 in the Sub-section 9.4.2.1. For example they obtained daily information on market trends and prices from the fax which led to higher market prices and less perished products and they could obtain information on pesticides and fungicides, which crops to cultivate, etc.

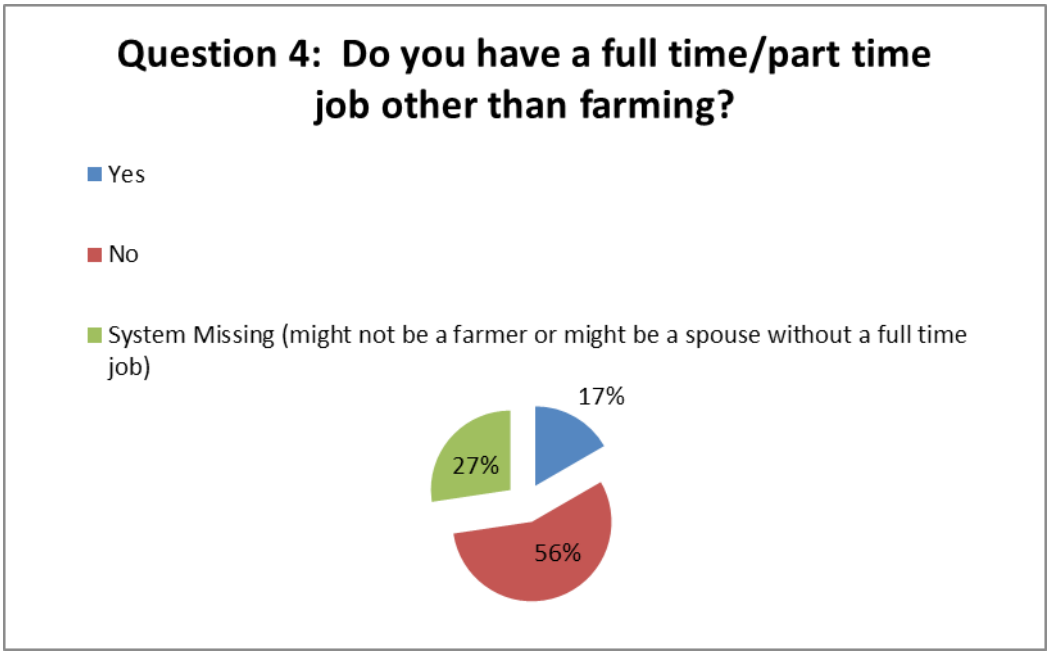
Question 4: Do you have a full time/part time job other than farming?

This question was important to the Vice-chairman, because with an additional income, the farmer could use the information and communication technologies also for private and work-related purposes, which could mean a source of income for the telecentre.

Table 6.3: Question 4

Q4. Do you have a full time/part time job OTHER than farming?		
	Frequency	**Percent**
Yes	14	16.7
No	47	56.0
System Missing (might not be a farmer or might be a spouse without a full time job)	23	27.4
Total	84	100.0
n = 84		

Figure 6.4. Question 4



Source: Researcher's calculation of question

RESULTS:

The outcome showed that 17% (14 respondents) of the farmers do also have a job on the side-line. It will be noted that with question 3 above 95% of the farmers indicated that they are full time farmers, which means that 18% of them still regard themselves as full time farmers while having another job. This means that those farmers still regard themselves as full time and that the part time job is just on the side and that the income generated is only additional to their farming income. This showed that the income generated from the farming alone does not provide enough income. This might have been due to various problems experienced by the farmers such as that the irrigation scheme which was not functioning, due to water scarcity, the lack of diesel and electricity for the pumps, and a lack of pumps to pump water from the canal as explained in Chapter 8 in Section

8.11.3 as well as in the letter of the Chairman of the Management Committee (Appendix P) and I Chapter 8 in Sub-section 8.8.2.

APPLICATION:

The researcher and the Extension Officer assisted in the compilation of draft document to present their agriculture-related problems. This resulted in a letter from the Chairman of the Management Committee to DWA to inform the DWA of these problems (Appendix P), which led to the rectification of (some of) these problems as mentioned above in Question 3.

Question 4.1: Full time such as:

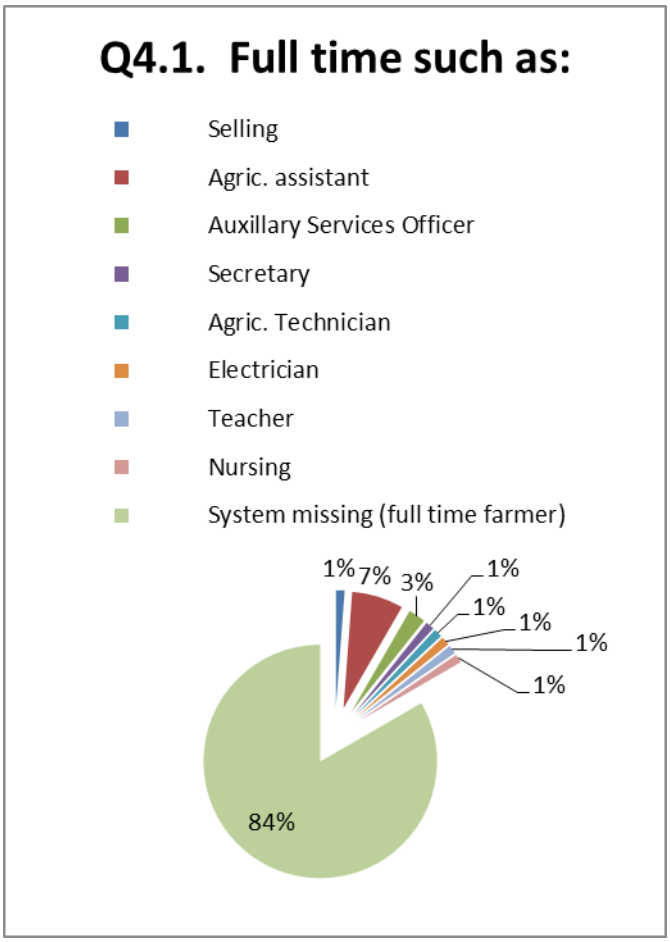
It was important to the researcher to know if the respondent farmed part time or full time, in order to note whether the farmer had income other than from farming.

Table 6.4: Question 4.1

Q4.1. Full time such as:		
	Frequency	**Percent**
Selling	1	1.2
Agric. assistant	6	7.1
Auxillary Services Officer	2	2.4
Secretary	1	1.2
Agric. Technician	1	1.2
Electrician	1	1.2
Teacher	1	1.2
Nursing	1	1.2
System missing (full time farmer)	70	83.3
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.5. Question 4.1



Source: Researcher's calculation of question

RESULTS:

The outcome shows that the only 14 respondents (also see Question 4) have other jobs than farming, as indicated, of which 6 were agricultural assistants, which means that they could be extension officers. Although the farmers who are farming full time (system missing) shows that 70 of the 84 farmers are farming full time, the other categories are a definite indication of other expertise in the Thabina community.

APPLICATION:

These agricultural assistants were also asked whether they could assist the Thabina farmers in their farming practices, as Thabina had only one extension officer. After lengthy participatory discussions with these agricultural assistants, it was decided that three of them would be available to assist the current extension officer in his duties. This expertise was also advertised in the brochure, to inform the surrounding communities and towns of the expertise in Thabina. Good use could also be made of the electrician and nursing interviewees. The teacher was also looked into regarding whether she could present classes in language skills, but it was not her forte. She would though, use the information and communication technologies for her correspondence and copying of study material. The electrician also offered his services to the Thabina community. This would be undertaken at a

much lower cost than the electricians from surrounding towns, as Thabina is an isolated community, far from these services.

Question 4.2: Part time such as?

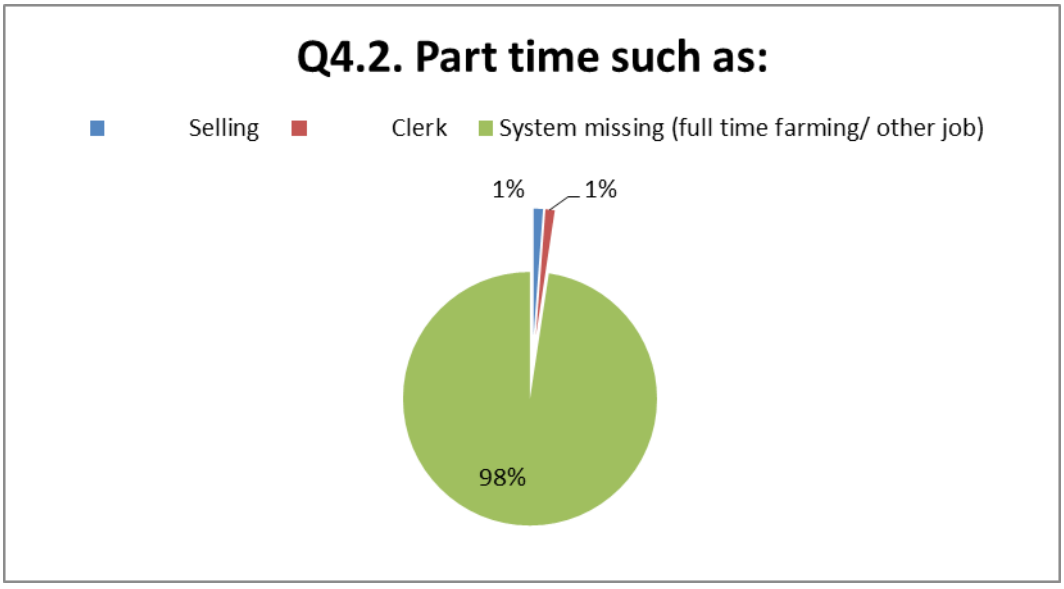
If a farmer has a part time income, it would mean that s/he might receive enough funds to make use of the information and communication technologies which would mean an income for the telecentre.

Table 6.5: Question 4.2

Q4.2. Part time such as:		
	Frequency	**Percent**
Selling	1	1.2
Clerk	1	1.2
System missing (full time farming/ other job)	82	97.6
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.5.1. Question 4.2



Source: Researcher's calculation of question

RESULTS:

82 of the interviewees did not complete this question – only 2 have part-time jobs, which could be interpreted as a high degree of self-sustainability in agriculture among the sample.

APPLICATION:

This outcome led to the interviewee in selling and the clerk utilising the information and communication technologies at the telecentre for their managerial and financial documents and systems to be typed, printed and copied.

Question 5: Other family members?

It was important for the researcher to obtain information on other family members such as spouses and children, who could also be potential users of the telecentre.

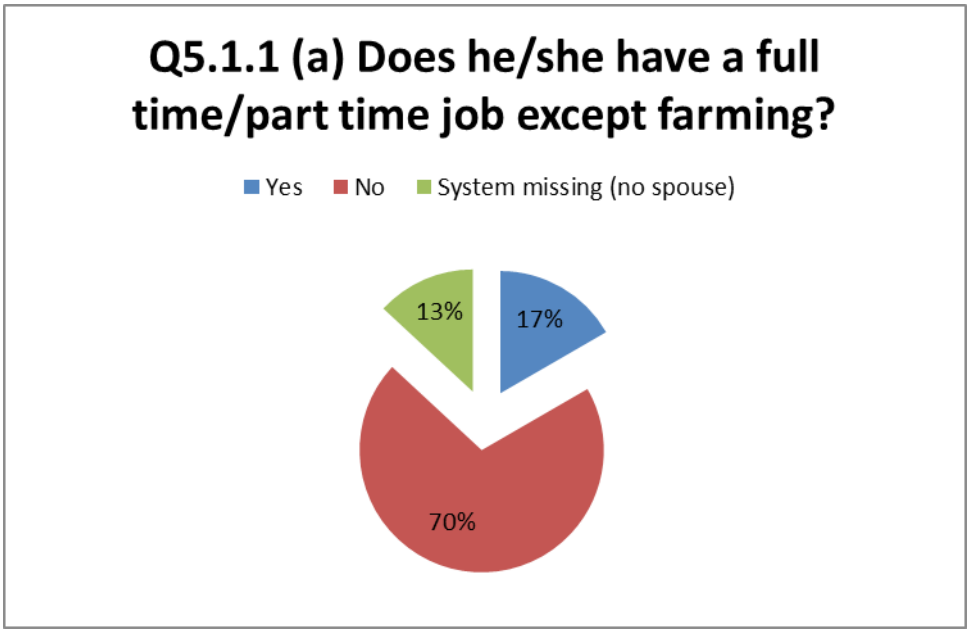
Q5.1.1 (a) Does he/she have a full time/part time job except farming?

Table 6.6: Question 5.1.1 (a)

Q5.1.1 (a) Does he/she have a full time/part time job except farming?		
	Frequency	**Percent**
Yes	14	16.7
No	59	70.2
System missing (no spouse)	11	13.1
Total	84	100
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.6. Question 5.1.1 (a)



Source: Researcher's calculation of question

RESULTS:

A large percentage of 70% indicated that the spouses do not have other jobs and work on the household farm. 14 of the spouses do have an extra income than farming, which meant that they could utilize the information and communication technologies to their benefit in their jobs. The 13% system missing could indicate that the respondent do not have a spouse. The following question was asked to determine whether the 17% of the spouses indicating a 'yes', could utilise the information and communication technologies.

APPLICATION:

As indicated in Chapter 9, Sub-section 9.4.2.2 the remaining adults, which were mainly women, could obtain information regarding their extra income from the library and also by fax regarding their crafting of their culture-related artefacts such as pottery from clay, beading and clothing as they are illiterate. The beads and material for clothing could be ordered by information and communication technologies such as the fax and the telephone. This Sub-section also stated that lectures on HIV/Aids, nutrition and child care, were arranged with the nurses of the nearby clinic as well as that all the children were vaccinated.

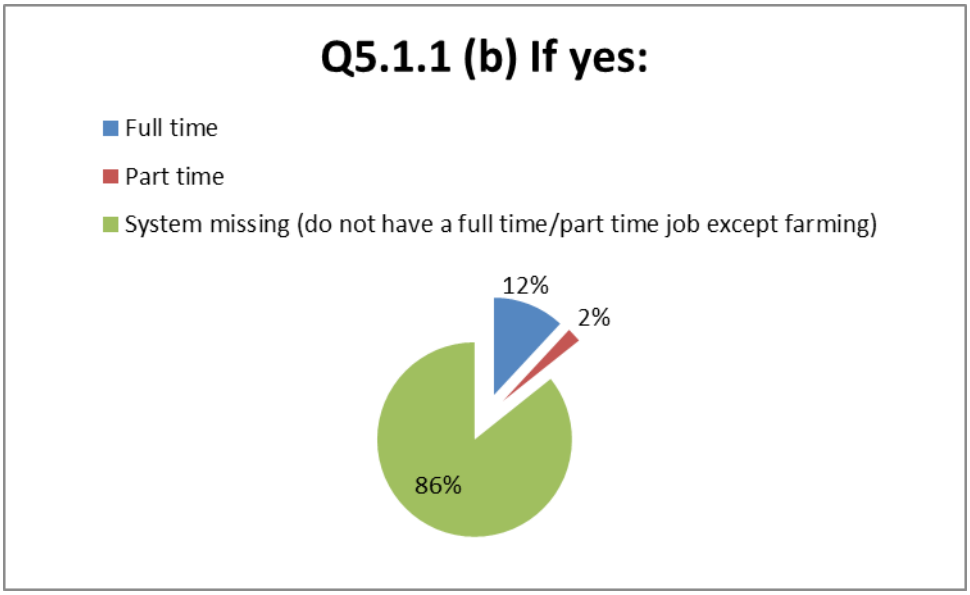
If Yes:

Table 6.7: Question 5.1.1(b)

Q5.1.1 (b) If yes:		
	Frequency	**Percent**
Full time	10	11.9
Part time	2	2.4
System missing (does not have a full time/part time job except farming)	72	85.7
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.7. Question 5.1.1 (b)



Source: Researcher's calculation of question

RESULTS:

A large percentage (86%) did not complete this question, indicating that the spouses do not have other jobs than farming, or that the respondent does not have a spouse. Although 14 respondents indicated a full time job in question 5.1.1(a), for this question, only 12 spouses replied to this question. Of the 12 spouses that have another income outside the family farm, 10 have full-time jobs.

APPLICATION:

This meant that the spouses rely on the income from farming produce and that they could utilise the information and communication technologies to their benefit in obtaining relevant agriculture-related information from the information and communication technologies. Those spouses in full time and part time jobs could benefit by the information and communicate technologies in compiling, printing and copying their managerial and financial documents, such as in jobs as indicated below in Question 5.1.1 (c).

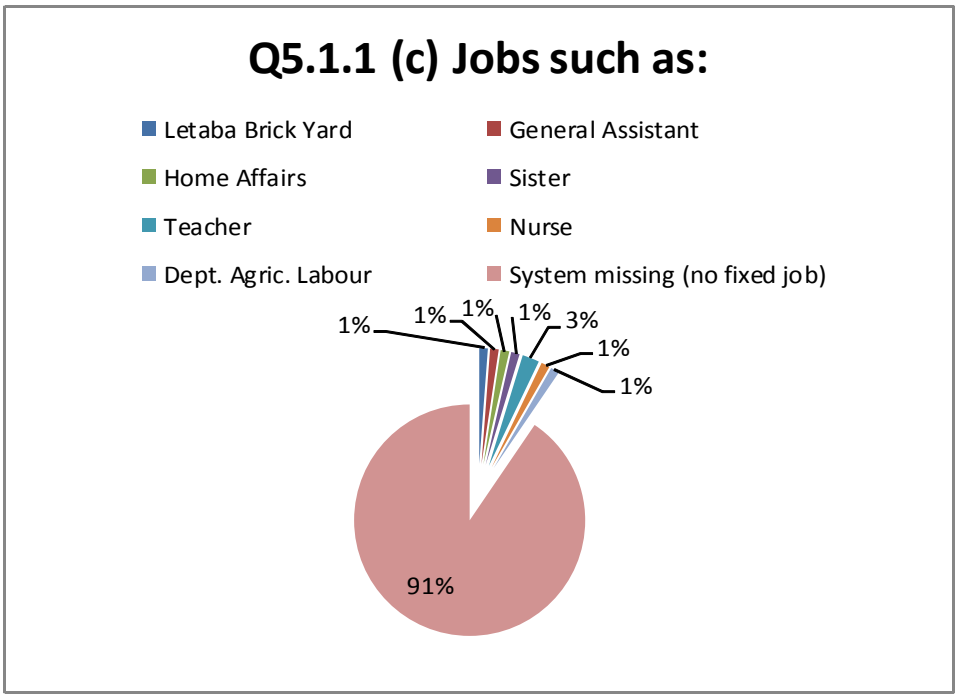
Jobs such as:

Table 6.8: Question 5.1.1 (c)

Q5.1.1 (c) Jobs such as:		
	Frequency	**Percent**
Letaba Brick Yard	1	1.2
General Assistant	1	1.2
Home Affairs	1	1.2
Sister	1	1.2
Teacher	2	2.4
Nurse	1	1.2
Dept. Agric. Labour	1	1.2
System missing (no fixed job)	76	90.5
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.8. Question 5.1.1 (c)



Source: Researcher's calculation of question

RESULTS:

It could be concluded that the high percentage of spouses of 91% that did not submit answers to this question did not have a fixed job, or that the respondent has no spouse. Again, only a small share of the farmers' spouses do have work away from the farm. Only 8 of the total number of 10 farmers whose spouses work full time could indicate the occupation of their spouse.

APPLICATION:

The farmer employed by the Letaba Brick Yard supported the gesture to arrange a meeting with his Director in order to arrange to buy bricks from the Brick Yard, and the interviewee also agreed to assist with the building of the facilities at Thabina at lower costs for man-hours. The sister and the nurse were employed by the nearby clinic, and played an important role in the addressing the socio-economic need on health aspects at the Thabina community: They assisted in the vaccination of the children and also supported the sister at the clinic to present lectures on health care and nutrition. These spouses could also obtain information from the information and communication technologies such as the telephone, the copier and the fax regarding these jobs in order to further their knowledge on these subjects. Anybody strives to be appointed on a full-time basis. Earning a full time salary would then also mean a higher income for the specific household.

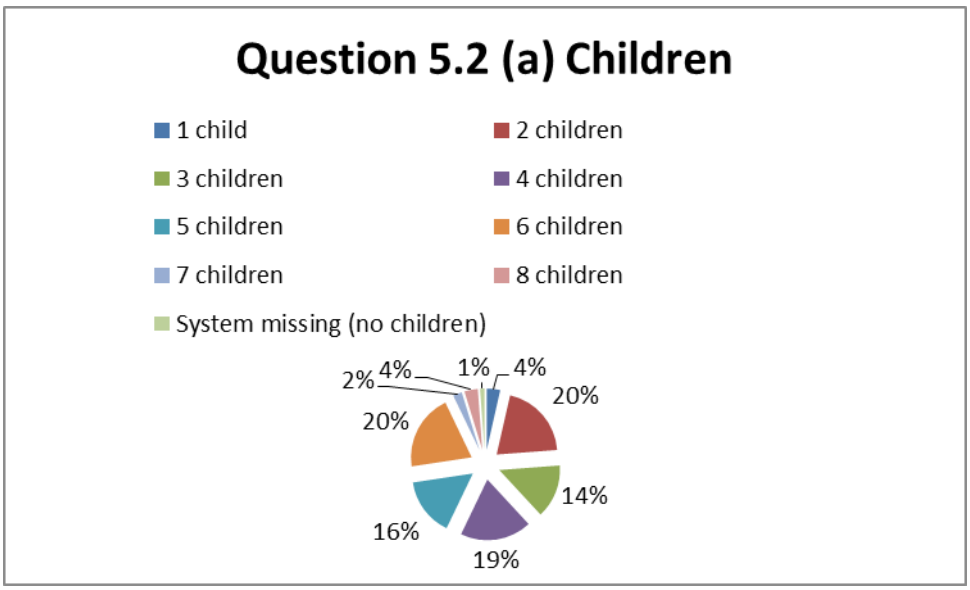
Question 5.2 (a): Number of children?

Table 6.9: Question 5.2 (a)

Q5.2 (a) Children		
Number of Children	**Frequency**	**Percent**
1 child	3	3.6
2 children	17	20.2
3 children	12	14.3
4 children	16	19.0
5 children	13	15.5
6 children	17	20.2
7 children	2	2.4
8 children	3	3.6
System missing (no children)	1	1.2
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.9. Question 5.2 (a)



Source: Researcher's calculation of question

RESULTS

The outcome shows that the farmers mostly have between two and six children per household. Only one farmer did not respond, which could mean that he does not have children. This means that children of various ages could make use of the telecentre in the following aspects:

APPLICATION:

Children - teenagers: The learners in the teenager phase attend the secondary school or the college nearby. It seemed that these learners could make good use of the information and communicate technologies. The curriculum of this college includes hands-on practical education such as welding, wood work, typing and cooking. In Chapter 9, in Sub-section 9.4.2.3 it was explained how these foreseen aspects realised: The learners could obtain information regarding these subjects by means of the telephone as well as fax and they could also copy study material on

these subjects. The computer could be used to type CV"s for job hunting, which could then be printed and faxed to the companies.

Children – teenagers illiterate and not attending school: According to he Management Committee, the parents of these children are worried that they would become street-children. It was foreseen that the telecentre could provide a save haven for these children – in the adjacent hall to the telecentre as such.

Children – primary school phase: The telecentre could offer a stimulating and interesting environment for development of children in this category, as the library could present children‟s books to read, the interesting colourful infotoons as well as colouring books. The telecentre could also play an important role if the Manager could make copies of the colouring and learning books from the school in order to keep the children busy. In Chapter 9 in Sub-section 9.4.2.4 it was explained how these foreseen aspects realised: It was explained that these objectives were reached and that the children made good use of the telecentre, with the support and the assistance of the secretary, being a qualified school teacher herself.

Children – infants: Lectures on child nutrition and health aspects could be arranged for the mothers of these children. The secretary of the telecentre could play a prominent role where she could arrange these aspects with the nearby clinic. The secretary could also arrange for lectures on health care and visits of the sisters of the clinic to the mothers at Thabina and surrounding communities. In Chapter 9 in Sub-section 9.4.2.5 it was explained how these foreseen aspects realised: All these arrangements were made by the secretary including that all the children of the Thabina community as well as surrounding communities were vaccinated by the medical personnel from the nearby clinic.

The option of utilising the adjacent hall was discussed with the Management Committee, who gave there consent to utilise this hall for the smaller children in order to provide them a save environment. In Chapter 9, in Sub-section 9.4.2.6 it was explained how these foreseen aspects realised: The telecentre could provide a safe environment for these children to be developed, by means of the colouring books duplicated by the copier as well as the colourful infotoons. This could lead to the parents of these children being pleased and satisfied that their children would be safe.

Question 6: Residence?

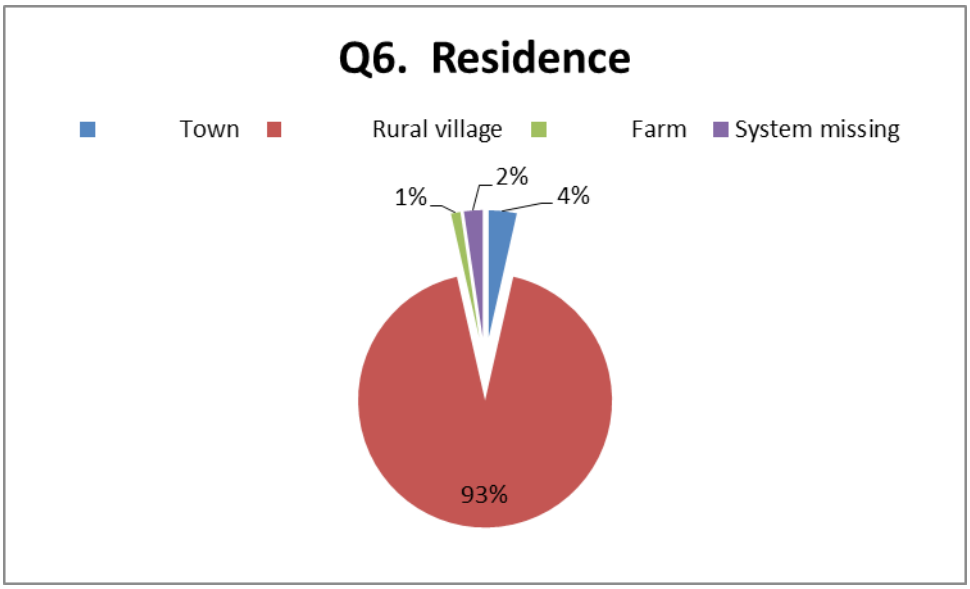
It was important to analyse whether the respondent would be able to make use of the telecentre – based on where the respondent lived relative to the telecentre which would make it more or less accessible.

Table 6.10: Question 6

Q6. Residence		
	Frequency	**Percent**
Town	3	3.6
Rural village	78	92.9
Farm	1	1.2
System missing	2	2.4
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.10. Question 6



Source: Researcher's calculation of question

RESULTS:

The outcome shows that 93% (78 respondents) live in a rural village and one on a farm. During discussions with the Management Committee, this rural village seemed to be the Thabina village. Only 4% (3 respondents) live in a town where there might be information and communication technologies.

APPLICATION:

It could be concluded then that these farmers will be close to the telecentre, and that they will be able to use the information and communication technologies offered by the telecentre. As the respondents indicated that they need agriculture-related information as well as socio-economic information, it was foreseen that both these sets of needs of the farmers could be addressed by the telecentre.

Question 6.1: Homeless?

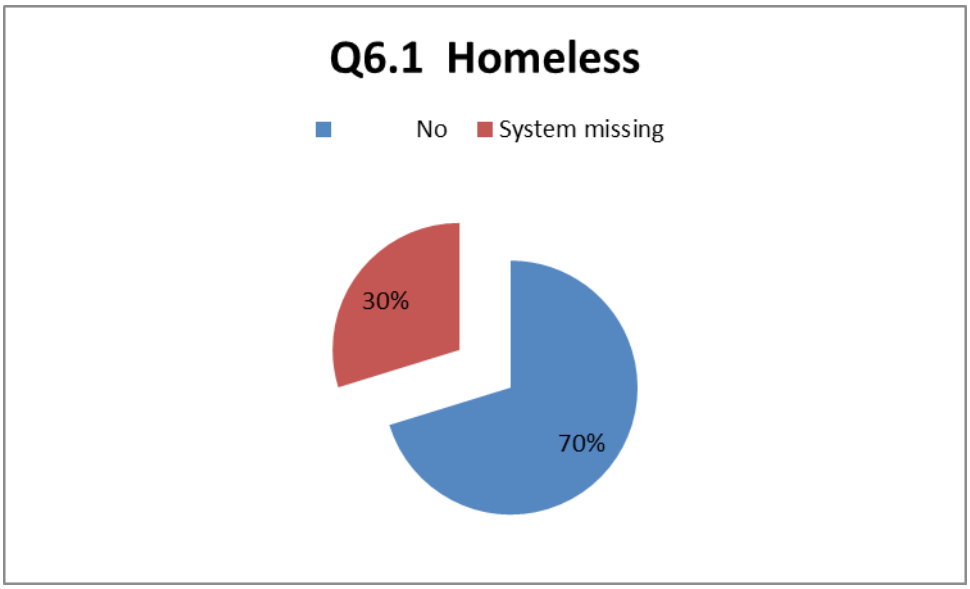
The question was included in order to confirm how many of the farmers do own a home. This could indicate the level of income, and whether the farmer would be able to pay for the usage of the information and communication technologies of the telecentre.

Table 6.11: Question 6.1

Q6.1 Homeless		
	Frequency	**Percent**
Own a home	59	70.2
System missing	25	29.8
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.11. Question 6.1



Source: Researcher's calculation of question

RESULTS:

The outcome showed that 59 of the respondents indicated that they own their home. It should be noted that all of the 59 respondents that own their home live in the Thabina region, which belongs to the Chief and can be considered as traditional or communal land. They saw their houses as belonging to themselves – their 'homes'. The other 25 respondents indicated that they do not own their homes. An inquiry revealed that all of these 25 respondents did in fact have a house on communal land that belonged to the chief but did not consider themselves to be the owner of these homes, but the chief.

Question 7: Age?

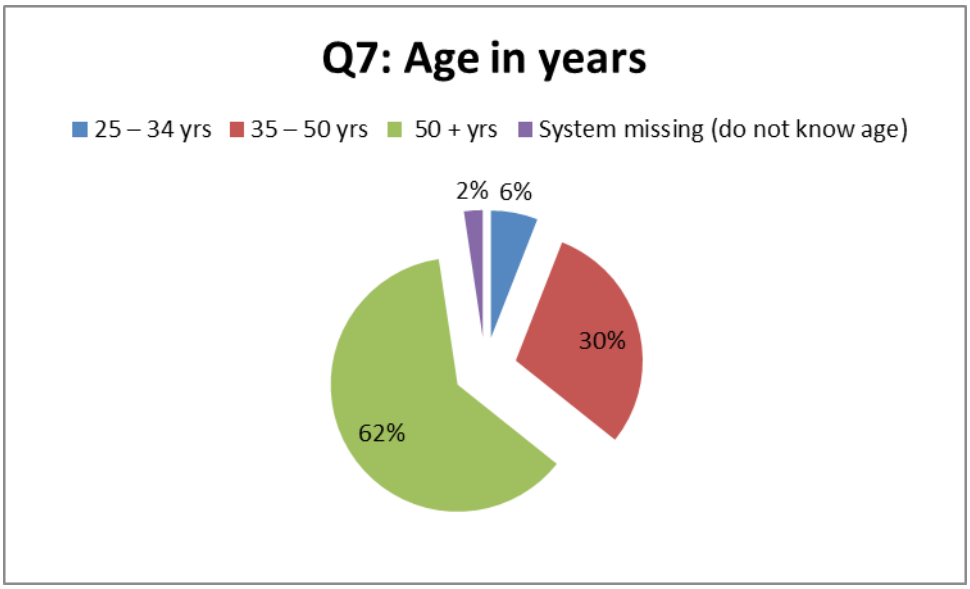
Obtaining an age profile of the respondents could be an important indicator and measurement of the usage of the information and communication technologies – older respondents might be technophobic, while younger respondents might be more inclined to use the telecentre and learn to operate the information and communicate technologies.

Table 6.12: Question 7

Q7: Age in years		
	Frequency	**Percent**
25 – 34 yrs	5	6.0
35 – 50 yrs	25	29.8
50 + yrs	52	61.9
System missing (do not know age)	2	2.4
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.12. Question 7



Source: Researcher's calculation of question

RESULTS:

This outcome could be seen as valid as only 2 respondents did not indicate their age. When taking into consideration that 62% of the farmers are older than 50 years, it could be concluded that these 2 farmers are elderly and might not know their age. The outcome is important to the relation of the farmers being able to utilise the information and communication technologies and whether the secretary would have to operate the information and communicate technologies on behalf of the older farmers and also whether she would have to translate the messages for the older, illiterate farmers. The outcome indicates that only 6% (5 respondents) of the respondents are 25 – 34 years of age. This means that these younger farmers, who might be more willing and able to learn to operate the information and communicate technologies, are the lowest, which was quite disappointing to the researcher. The results also showed that 62% (52 respondents) were above the age of 50+ years.

APPLICATION:

It could be concluded then that a skilful secretary would have to be appointed, as the 63% older farmers, who might be illiterate, would need assistance in the operation of the information and communicate technologies. But no problems were foreseen, as most being farmers needed agriculture-related information, which means that these farmers would need the same information as the rest of the respondents, being younger than them. The reason being that they all cultivate the same crops at the Thabina irrigation scheme and that they all use the same irrigation system, namely the flood irrigation from the Thabina canal.

Question 8: Gender?

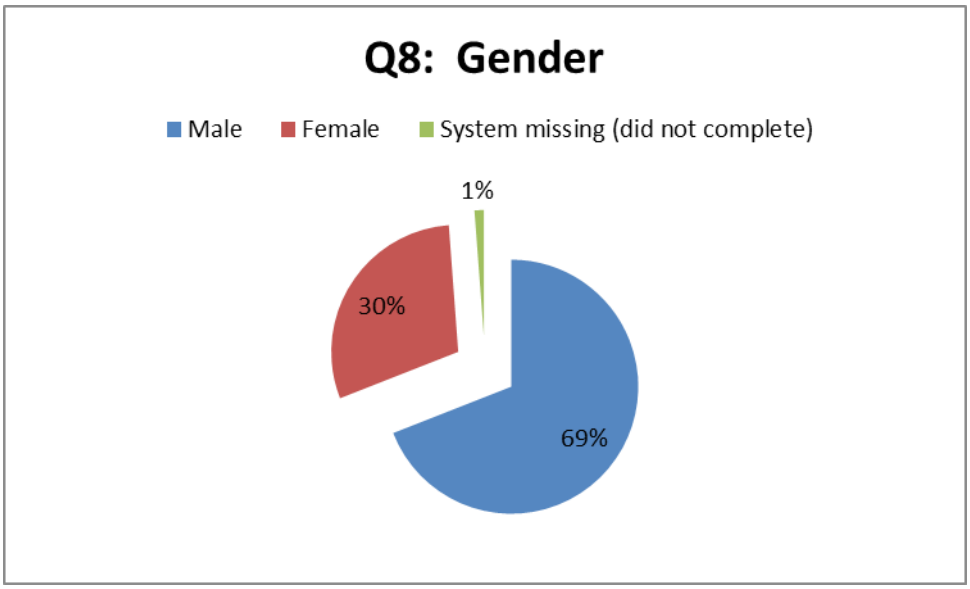
This Question was important as there were many female farmers. It was important to note whether they would use the telecentre for other purposes than farming, as well – such as tele-medicine, etc.

Table 6.13: Question 8

Q8: Gender		
	Frequency	**Percent**
Male	58	69.0
Female	25	29.8
System missing (did not complete)	1	1.2
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.13. Question 8



Source: Researcher's calculation of question

RESULTS:

Since only 1 respondent did not complete this question which means that the outcome is valid as this one respondent might just oversee/note this question. The outcome shows that most farmers are male (69%). But a 30% of the farmers are female, which means that they would also, despite their agriculture-related information needs, have other socio-economic needs as being mothers themselves. These could include information on assisting, nurturing and supporting their children, as was explained in Question 5.2 (a) as well as regarding their children, as indicated in Question 5.1.1 (b).

APPLICATION:

This incorporation of the needs of the female farmers and spouses resulted in arrangements made for female farmers as well as their children as explained in Chapter 9 in Section 9.4.2.

Question 9: Marital status?

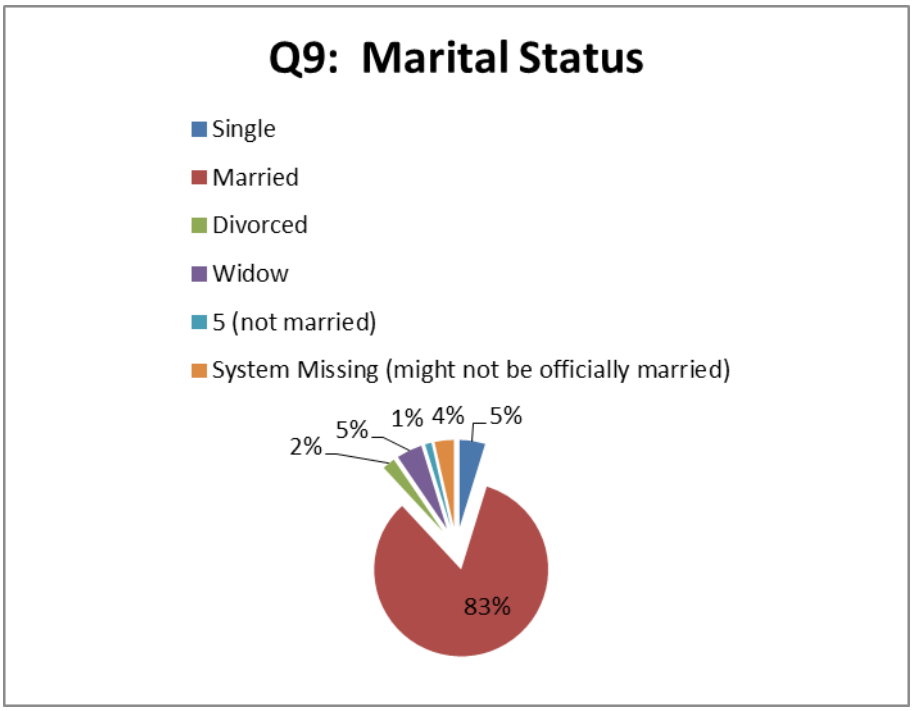
During the completion of the interview schedules, this question proved to be of little consequence, because marriage was not prerequisite to having children, a man could have more than one wife or children with more than one woman without being married.

Table 6.14: Question 9

Q9: Marital Status		
	Frequency	**Percent**
Single	4	4.8
Married	70	83.3
Divorced	2	2.4
Widow	4	4.8
5 (not married)	1	1.2
System Missing (might not be officially married)	3	3.6
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.14. Question 9



Source: Researcher's calculation of question

RESULTS:

The outcome indicated that most of the respondents (83%) were married. As explained, the farmer could also have more than one wife. But it could be deducted though, that there are another person/persons who might have extra income and also that there are children in the household, which was covered in Question 5.2(a). The 1 'not married', could be living together as husband and

wife, with their family, although not being officially married. It was explained to the respondents that 'other' specifically mean 'widowed'.

Question 10: Education?

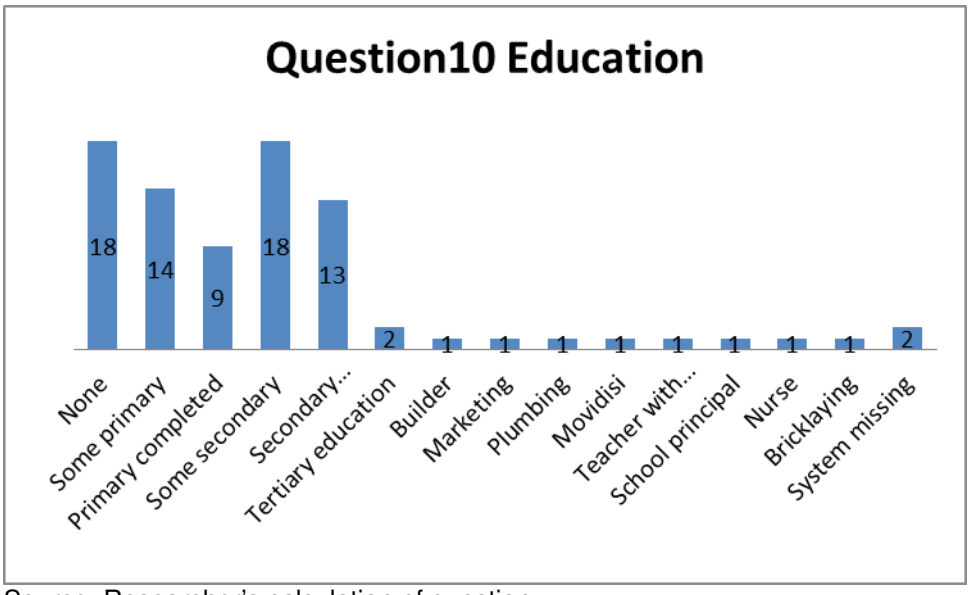
The literacy aspect was important to the researcher, as sessions from the school or technikon could be arranged.

Table 6.15: Question 10

Q10. Education		
	n	%
None	18	25.6%
Some primary	14	18.3%
Primary completed	9	12.2%
Some secondary	18	23.2%
Secondary Completed (matric)	13	17.1%
Tertiary education	2	2.4%
Builder	1	1.2%
Marketing	1	1.2%
Plumbing	1	1.2%
Movidisi	1	1.2%
Teacher with diploma	1	1.2%
School principal	1	1.2%
Nurse	1	1.2%
Bricklaying	1	1.2%
System missing	2	2.4%
Total	84	100%
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.15. Question 10



Source: Researcher's calculation of question

RESULTS:

The nurse, the teacher with the diploma and the principal had tertiary training which makes the respondents with tertiary education, 4 respondents. This outcome shows that the highest levels of education of the respondents were matric (13) some secondary (18 respondents) and primary and some primary completed (23 respondents). An alarming 18 respondents (26%) had no education. A total of 56% of farmers have either no education or only primary school education. There may be a link between the level of education and the older generation of farmers who make up 63% of all farmers.

APPLICATION:

Although the following answers do not indicate the level of education, the respondents in both the above as well as other occupations indicated (builder, marketing, plumbing, movidisi and bricklaying) could make good use of the information and communication technologies by means of the computer as well as the printer-copier-fax-scanner in their professions such as compiling and printing documents (managerial or other) as well as to copy, print or fax documents needed for their profession. The 21 respondents with no education might need tele-schooling once the Internet could be afforded. This would assist these illiterate farmers to gain schooling and education in reading and writing which would enable them to comprehend information on their farming practices much easier, as the secretary had to explain to them at that stage.

This Question also presented valuable information for the intended brochure. This expertise could also be included in the brochure to inform readers about the various kinds of services they could obtain from Thabina

Question 11.1: Literate?

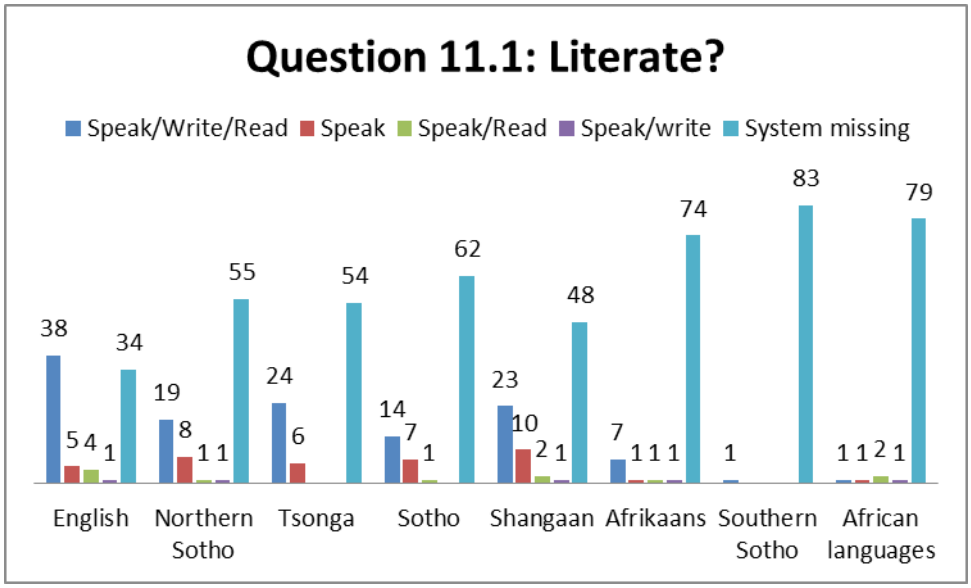
The respondent's potential to understand English was an important measurement, as English is the language of the technology. The question is also important in order to determine how to address the ICT needs – what to buy in order to address the needs.

Table 6.16: Question 11.1 – 11.8

	Speak/Write/Read	Speak	Speak/Read	Speak/write	System missing
English	38	5	4	1	34
Northern Sotho	19	8	1	1	55
Tsonga	24	6			54
Sotho	14	7	1		62
Shangaan	23	10	2	1	48
Afrikaans	7	1	1	1	74
Southern Sotho	1				83
African languages	1	1	2	1	79
n = 84					

Source: Researchers calculation of data received from questionnaires

Figure 6.16 Question 11.1 – 11.8



Source: Researcher's calculation of question

RESULTS: Question 11.1 – Question 11.8

The outcome presented 38 respondents that they could speak/read/write in English, with a 24 respondents in Tsonga and 23 in Shangaan. This meant that the infotoons, brochures and booklets (Appendix L) in the library of which the establishment was explained in Chapter 7 in Section 7.7, would be understood by some farmers and that the secretary would have to translate and explain these documents to the farmers in Tsonga and Shangaan, as these languages are the second and third most spoken and understood (indigenous languages).

APPLICATION:

The aim of this question was to investigate how language should be taken into consideration to address the information needs and the ICT needs – how language should be accommodated to address this need. As it could be concluded that one farmer could

understand more than one language, this proved not to be a problem, as the secretary understood most of the African languages, and she could translate the information obtained from the information and communication technologies from English into the specific African language of the farmer.

- **(II) Current exposure to ICT (information and communication technologies)**

The following questions were important to the research, and the researcher had to explain the questions briefly to the Chairman and the Vice-Chairman.

Question 12 (a): What is the availability of and your exposure to ICT?

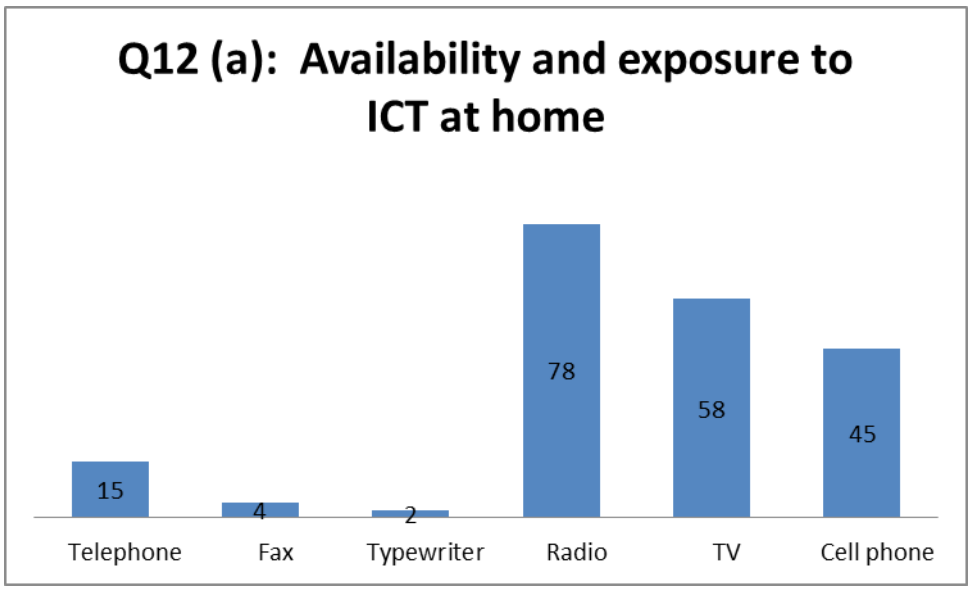
This close ended question was compiled by the researcher in collaboration with the Chairman of the Management Committee, who had a computer at home. The researcher had to explain the aspects such as the modem, of which the rest of the Management Committee was unfamiliar with.

Table 6.17: Question 12 (a)

Q12 (a): Availability and exposure to ICT at home	
Telephone	15
Fax	4
Typewriter	2
Radio	78
TV	58
Cell phone	45
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.17. Question 12 (a)



Source: Researcher's calculation of question

RESULTS:

The outcome shows that the information and communication technology exposed to at home mostly is the radio, with the typewriter being available at only 2 households.

APPLICATION:

With the cell phone available at 45 households and the telephone at only 15 households, it was envisaged that the farmers would make good use of the telephone in the telecentre, which was also substantiated by the table completed on the usage of the telephone as the information and communication technology used most (Appendix N) with the fax (4 respondents) and the typewriter (2 respondents) sparsely available, could be concluded that the computer will be used optimally by the farmers who not only needs typing, but also printing, faxing and copying from the multifunctional printer.

Q12 (b). Availability and exposure to ICT at your job

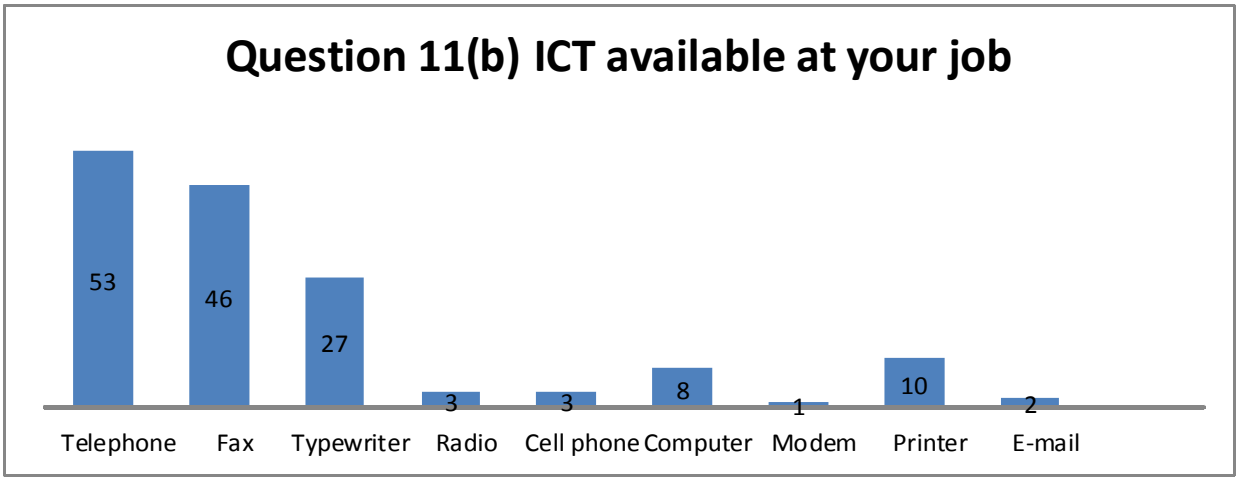
One person could have access to more than one ICT at work.

Table 6.18: Question 12 (b)

Q12 (b). Availability and exposure to ICT at your job	
Telephone	53
Fax	46
Typewriter	27
Radio	3
Cell phone	3
Computer	8
Modem	1
Printer	10
E-mail	2
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.18. Question 12 (b)



Source: Researcher's calculation of question

RESULTS:

53 of the respondents had a telephone at work, with the availability of the computer (8), modem (1 respondents) and e-mail (2 respondents) being lowest. Although only 14 interviewees indicated having a full time or part time job, these high figures might indicate that these farmers were employed at the Water User Association itself.

APPLICATION:

It was foreseen that the information and communication technologies such as the computer with its various applications as well as the multifunctional printer, would be optimally used, as they were scarcely available at home (previous question) as well as at work for those who work away from home.

Q12 (c): Availability and exposure to ICT elsewhere

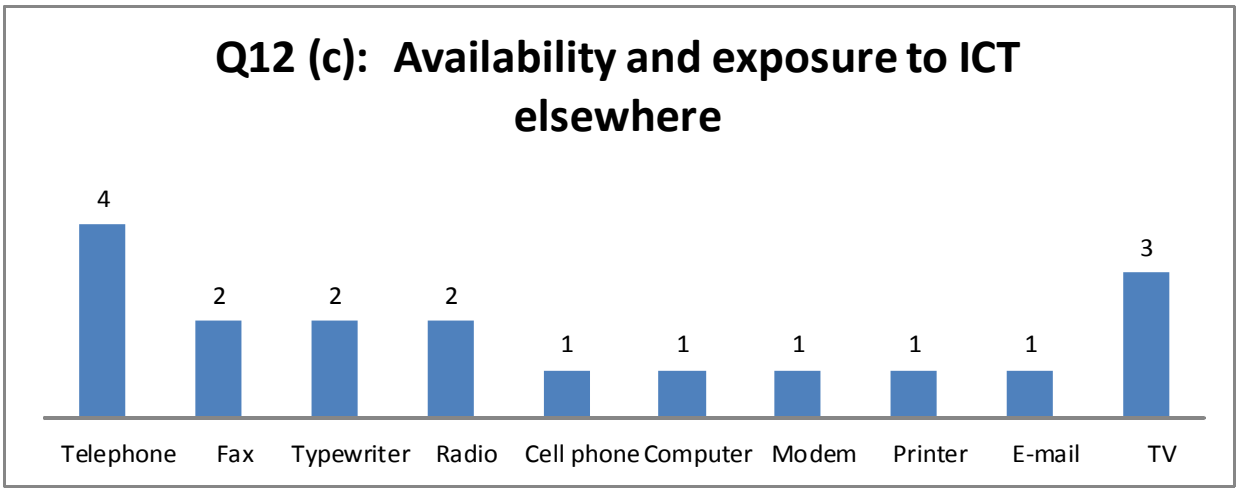
A person could have access to more than one ICT at another location.

Table 6.19.: Question 12 (c)

Q12 (c). Availability and exposure to ICT elsewhere	
Telephone	4
Fax	2
Typewriter	2
Radio	2
Cell phone	1
Computer	1
Modem	1
Printer	1
E-mail	1
TV	3
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.19. Question 12 (c)



Source: Researcher's calculation of question

RESULTS:

The telephone is once again the information and communication technology available the most, with the availability of the typewriter (2 respondents), computer (1 respondent), printer (1 respondent) and modem (1 respondent) the lowest.

APPLICATION:

It was foreseen that the telephone as well as the multifunctional printer would be made good use of in the telecentre.

RESULTS: Question 12 (a - c):

It was clearly indicated that the interviewees had little, if any, exposure to and availability of information and communication technologies at home, at their job or elsewhere. There is thus a significant motivation to purchase the information and communication technologies such as the computer and the multifunctional printer.

APPLICATION:

Since the Thabina community is situated far from towns and villages offering these information and communication technologies (Question 33 – 38 below), the usage of the telephone was measured to be optimal (Appendix N). With information and communication technologies such as a telephone, computer and multifunctional printer, it could be concluded that the farmers are dependent on the information and communication technologies at the telecentre. It was envisaged that these information and communication technologies such as the computer and the multifunctional printer would be made good use

of, as was also proven by tables completed on the usage thereof in Appendix as an example of one questionnaire completed (multifunctional printer) and Appendix N (telephone).

Question 13 (a - e): Your need for ICT?

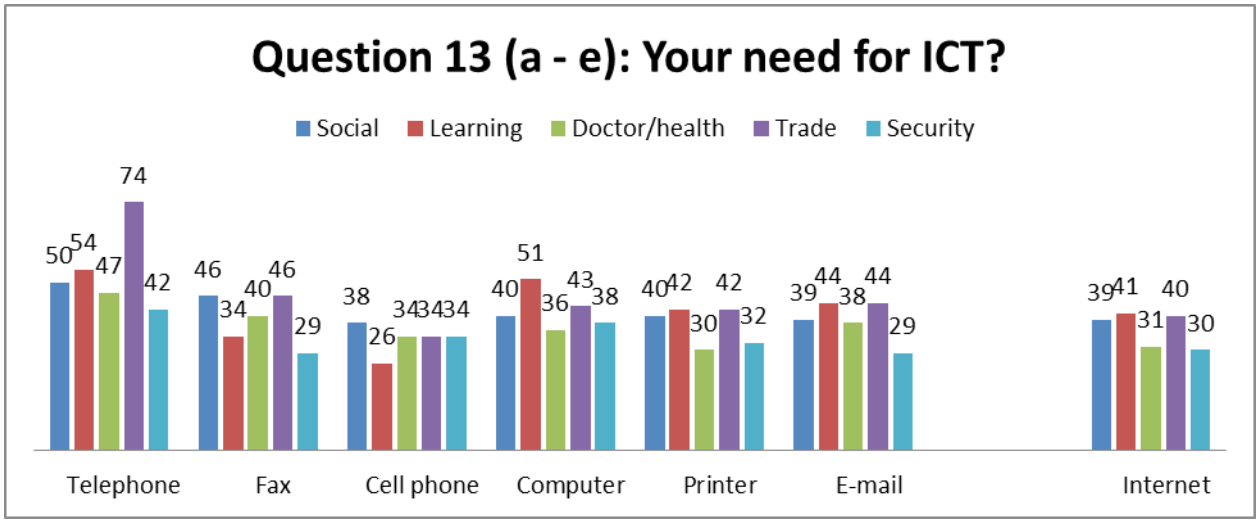
It was important to note for what purpose the respondent need the ICT. The question was presented in a tabular format. The answers were structured so that the respondent only had to draw a circle around the specific ICT needed, in the relevant column (social, doctor, security, etc.) (multiple). The Management Committee suggested the categories, as they saw these categories as the most important socio-economic categories which had to be addressed.

Table 6.20: Question 13 (a - e)

Q13 (a - e): Needs for Information and Communication Tools					
	Social	Learning	Doctor/health	Trade	Security
Telephone	50	54	47	74	42
Fax	46	34	40	46	29
Cell phone	38	26	34	34	34
Computer	40	51	36	43	38
Printer	40	42	30	42	32
E-mail	39	44	38	44	29
Internet	39	41	31	40	30
Photocopier	37	40	29	47	28
n = 84					

Source: Researchers calculation of data received from questionnaires

Figure 6.20 Question 13 (a – e)



Source: Researcher's calculation of question

RESULTS:

The most respondents indicated that they need to communicate regarding trade, social and learning, with the telephone, computer and Internet heading the list of ICT needed. The cell phone was the least needed (26 respondents) for learning. For doctor/health, the telephone

was mentioned as the most important (47 respondents) as the telephone was the fastest way to contact a doctor or a hospital. At work the cell phone, which is used mainly for private purposes if a telephone is available at work, was rated the lowest with a 34 respondents. The outcome showed that apart from their agriculture-related needs, the farmers also have socio-economic and ICT information needs.

APPLICATION:

Information regarding these categories was obtained by means of the telephone as well as the brochures which were ordered from the technikon for the category on learning. The category on security was mentioned by the Chairman in a letter to the researcher to be submitted to DWA (Appendix P). With the need on health care the highest, the secretary, with the assistance of the researcher, organised with the nearby clinic to vaccinate all the children of Thabina and also for lectures on nutrition, child care, HIV/Aids; and many other health aspects, as explained in Chapter 8, Sub-section 8.11.2. Although the interviewees expressed a need for the e-mail and Internet, purchasing these ICT did not realise due to financial constraints.

Question 13 (b 1 - 3): How often?

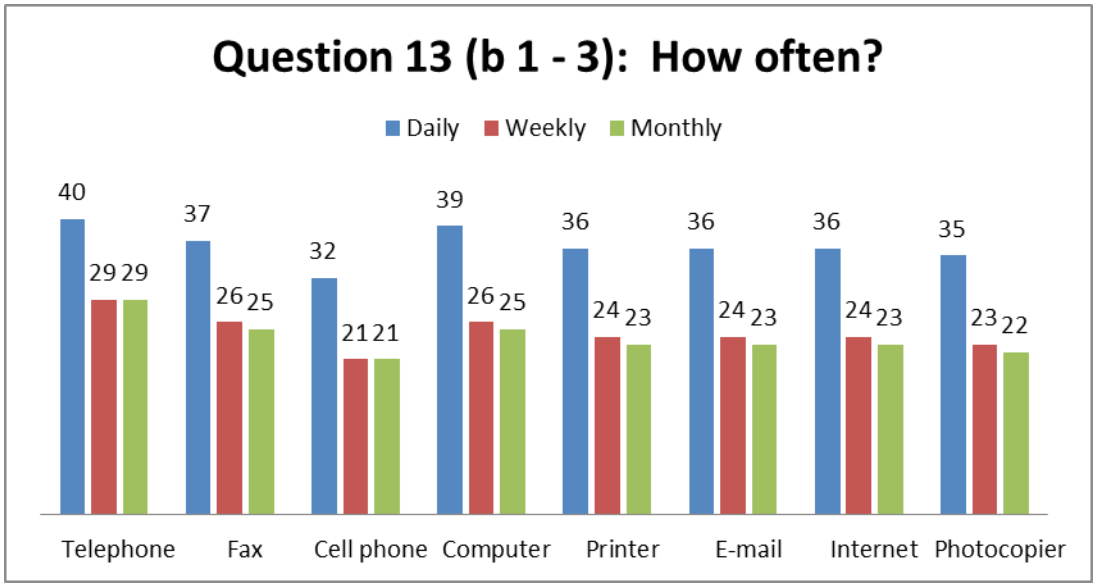
It was important to note how often the respondent needed the ICT. The question was presented in a tabular format. The questions were close ended so that the respondent only had to draw a circle around the specific ICT needed, in the relevant columns (daily, weekly or monthly) (multiple).

Table 6.21: Question 13 (b 1 - 3)

Q13 (b 1 - 3). How often?			
	Daily	**Weekly**	**Monthly**
Telephone	40	29	29
Fax	37	26	25
Cell phone	32	21	21
Computer	39	26	25
Printer	36	24	23
E-mail	36	24	23
Internet	36	24	23
Photocopier	35	23	22
n = 84			

Source: Researchers calculation of data received from questionnaires

Figure 6.21. Question 13 (b 1 - 3)



Source: Researcher's calculation of question

RESULT:

The telephone was rated the highest in all three categories with the computer second and most of the ICT just behind. Important to note is that the cell phone is rated the lowest overall. Interesting is that on a monthly basis, the fax (25 respondents) and the computer (25 respondents) was rated as second highest with the cell phone rated the lowest (21 respondents). The outcome indicates an important need for the information and communication technologies. The need on a monthly basis is calculated as the lowest, due to the high daily need for the ICT.

APPLICATION:

Since the respondents indicated that they need the information and communication technologies on a daily basis, the Management Committee decided that the telecentre should be open seven days a week, which meant that the telecentre operated on a Saturday morning until 12:00 as well as on a Sunday morning from 08:00 to 10:00.

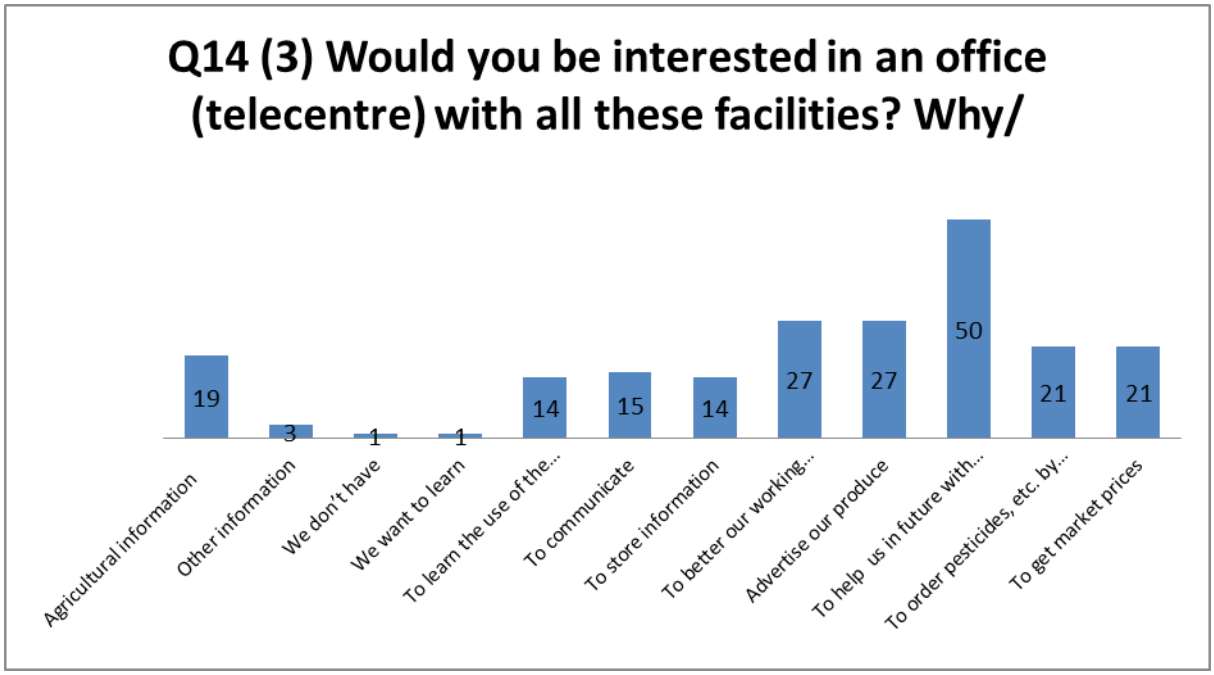
Question 14 (3): Would you be interested in an office (telecentre) with all these facilities? Why/

Table 6.22: Question 14 (3)

Q14 (3) Would you be interested in an office (telecentre) with all these facilities? Why/	
Agricultural information	19
Other information	3
We don't have	1
We want to learn	1
To learn the use of the machines	14
To communicate	15
To store information	14
To better our working conditions	27
Advertise our produce	27
To help us in future with farming	50
To order pesticides, etc. by phone	21
To get market prices	21
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.22. Question 14 (3)



Source: Researcher's calculation of question

RESULTS:

Most of the respondents (50) indicated that the telecentre with these facilities would assist and support them in their farming practices in the future. To better our working conditions (27 respondents) and advertise our produce (27 respondents) were rated second.

APPLICATION:

These agriculture-related needs (19 respondents) posed to be all addressed by the information and communication technologies. They ordered pesticides, seeds and fungicides (21 respondents) by phone from the co-op and obtained market prices (21 respondents) from SAFEX by fax. They could now also store (14 respondents) their information such as their accounts, which was done manually previously, and they have a managerial system as well as a financial system. They communicated (14 respondents) by telephone and fax.

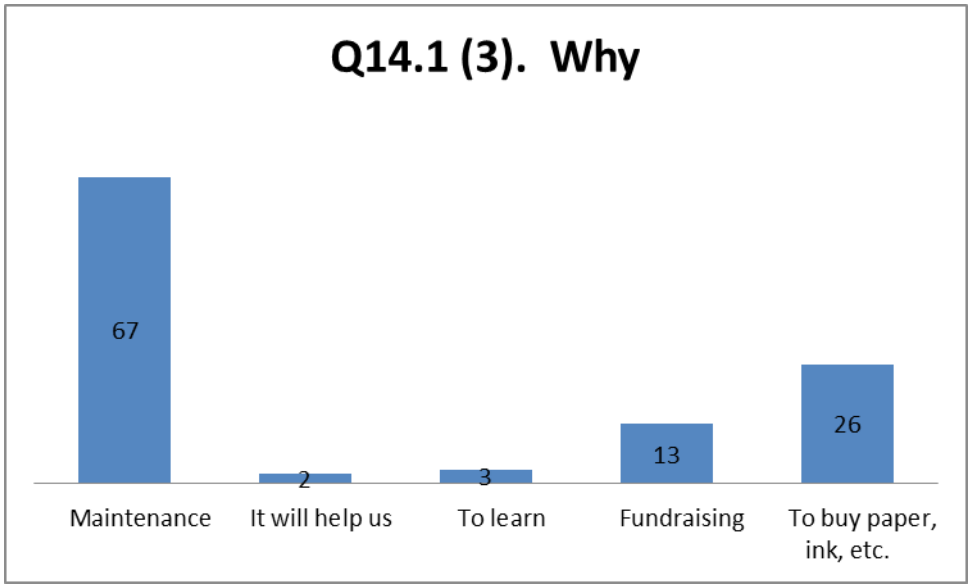
Question 14.1 (3). Why?

Table 6.23: Question 14.1 (3)

Q14.1 (3). Why	
Maintenance	67
It will help us	2
To learn	3
Fundraising	13
To buy paper, ink, etc.	26
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.23. Question 14.1 (3)



Source: Researcher's calculation of question

RESULT:

The highest amount of respondents saw maintenance (67 respondents) as the main reason for paying for the usage of the ICTs. The other 26 respondents indicated to buy stationary, as well as a few to help us (the farmers) (2 respondents) and to learn (3 respondents) and for fund raising (13 respondents).

APPLICATION:

These answers came with a new insight into the comprehension of the farmers regarding the ICT. A new drum for the multifunctional printer had to be bought, as well as paper and ink for the multifunctional printer.

Question 14.1: Would you be willing to use the Technology at a nominal fee?

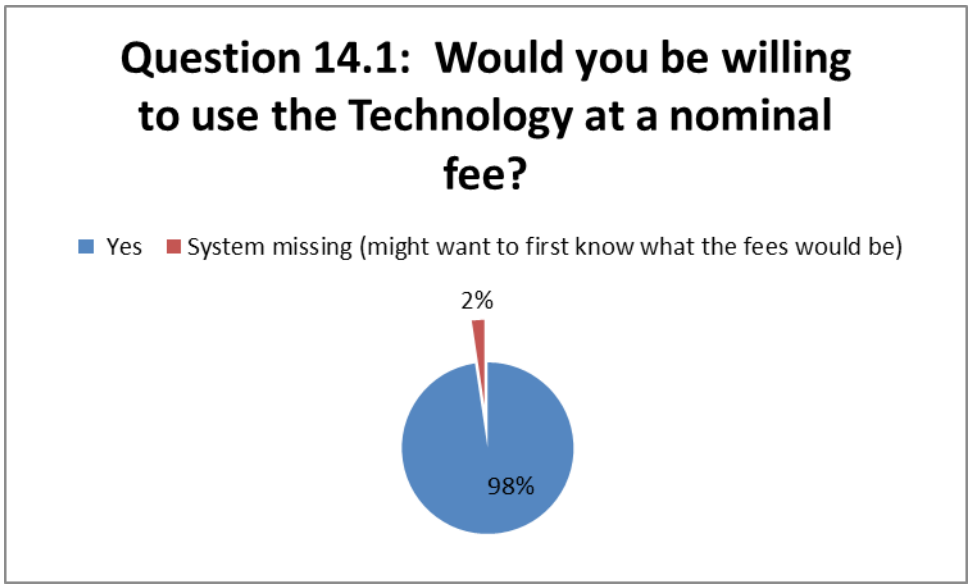
It was necessary to ask the respondent if s/he would pay a nominal fee for the usage of the ICT. Whether they would be willing to pay a nominal fee, would have a direct influence on the viability of the telecentre.

Table 6.24. Question 14.1

Q14.1: Would you be willing to use the Technology at a nominal fee?		
	Frequency	**Percent**
Yes	82	97.6
System missing (might want to first know what the fees would be)	2	2.4
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.24 Question 14.1



Source: Researcher's calculation of question

RESULT:

The outcome confirmed that the respondents (98%) would not mind to pay a nominal fee for the utilisation of the information and communication technologies.

APPLICATION:

The Management committee was much pleased with this indication, as no funding was obtained from government to run the telecentre. As explained in Chapter 7, in Sub-section 7.4.1 on the implementation of the information and communication technologies: Action 1 and also mentioned during field-notes taken, the purchase of the information and communication technologies was by means of donor funding.

The price list is seen in Appendix M. All users of the information and communication technologies adhered to pay these prices and it formed a substantial part of the income of the telecentre.

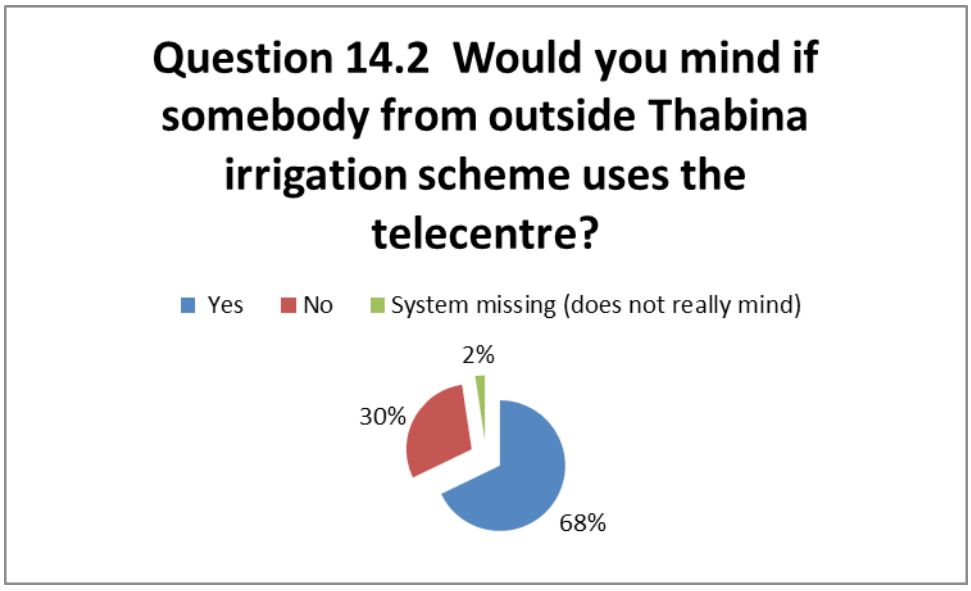
Question 14.2: Would you mind if somebody from outside Thabina irrigation scheme uses the telecentre?

Table 6.25: Question 14.2

Question 14.2: Would you mind if somebody from outside Thabina irrigation scheme uses the telecentre?		
	Frequency	**Percent**
Yes	57	67.9
No	25	29.8
System missing (does not really mind)	2	3.1
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.25. Question14.2



Source: Researcher's calculation of question

RESULTS:

There was a huge debate regarding this question with all four the Wards. The reason being that the farmers of all four Wards could not decide whether to allow users from outside their community or not. This was a closed ended question with the result indicating that the most farmers (68%) would not mind users from outside their community. There were, though some conditions mentioned, which will be discussed in the next question.

APPLICATION:

Since the most respondents (57 respondents) indicated a 'yes' (68%), the Management Committee decided that the telecentre could be utilised by those outside Thabina as well. This proved to be a good decision, as the surrounding communities as well as the schools and the technikon mad good use of the telecentre, as explained in Chapter 8 in Sub-section 8.7 and Chapter 9 in Sub-section 9.6.

Question 14.2.1: Conditions: (higher fees, restricted hours, etc.)?

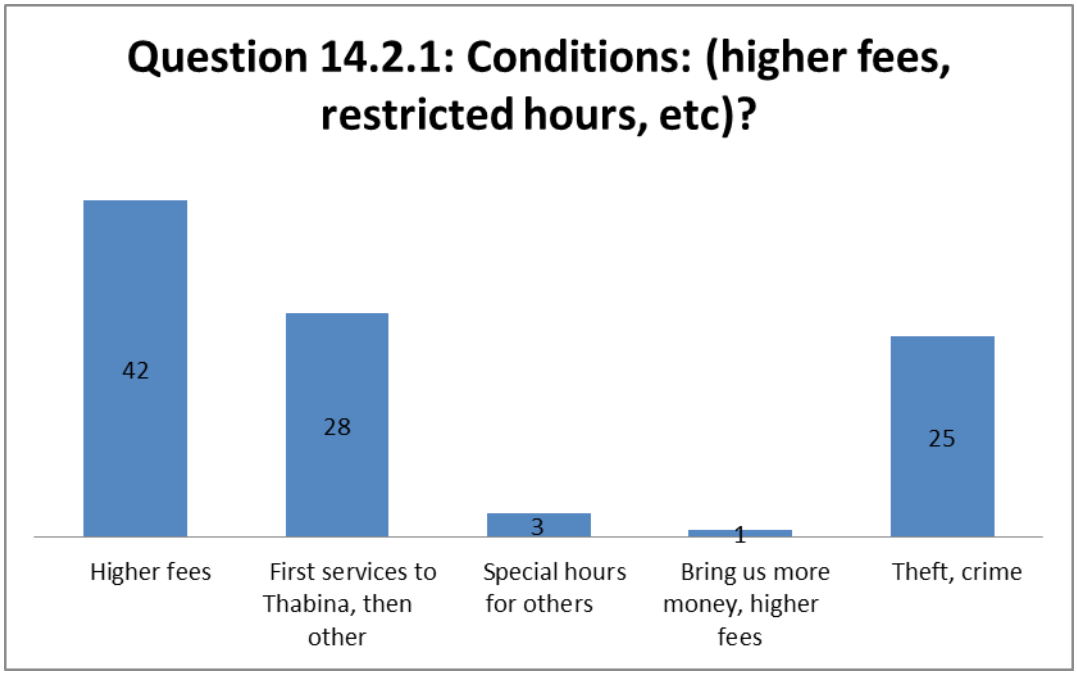
This open ended question was seen as most important, as the farmers should be satisfied with the usage of the telecentre by people outside Thabina – and if there were conditions, it should be met.

Table 6.26: Question 14.2.1

Q14.2.1. Conditions: (higher fees, restricted hours, etc.)	
Higher fees	42
First services to Thabina, then other	28
Special hours for others	3
Bring us more money, higher fees	1
Theft, crime	25
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.26. Question 14.2.1



Source: Researcher's calculation of question

RESULTS:

The outcome showed a definite preference to the paying of higher fees (42 respondents) for those from outside Thabina and that the farmers of Thabina should first be served in the telecentre (28 respondents). Those apposing the usage from people outside Thabina, mentioned the condition that people form outside Thabina should use the telecentre only during special hours (3 respondents) and the complaint was mainly the occurrence of theft and crime (25 respondents).

APPLICATION:

Although the Management Committee decided that the users form outside Thabina did not have to pay higher fees for the usage of the information and communication technologies, there was a definite implementation of the 'first service to Thabina' (28 respondents). The surrounding users also know that the farmers irrigate in the mornings before 10:00 and therefore the telecentre was utilised by users outside the Thabina community early in the mornings. On some occasions there was a long queue as early as 07:00 when the secretary would arrive at the telecentre.

Question 15.1: What kind of information do you need? (Farming)

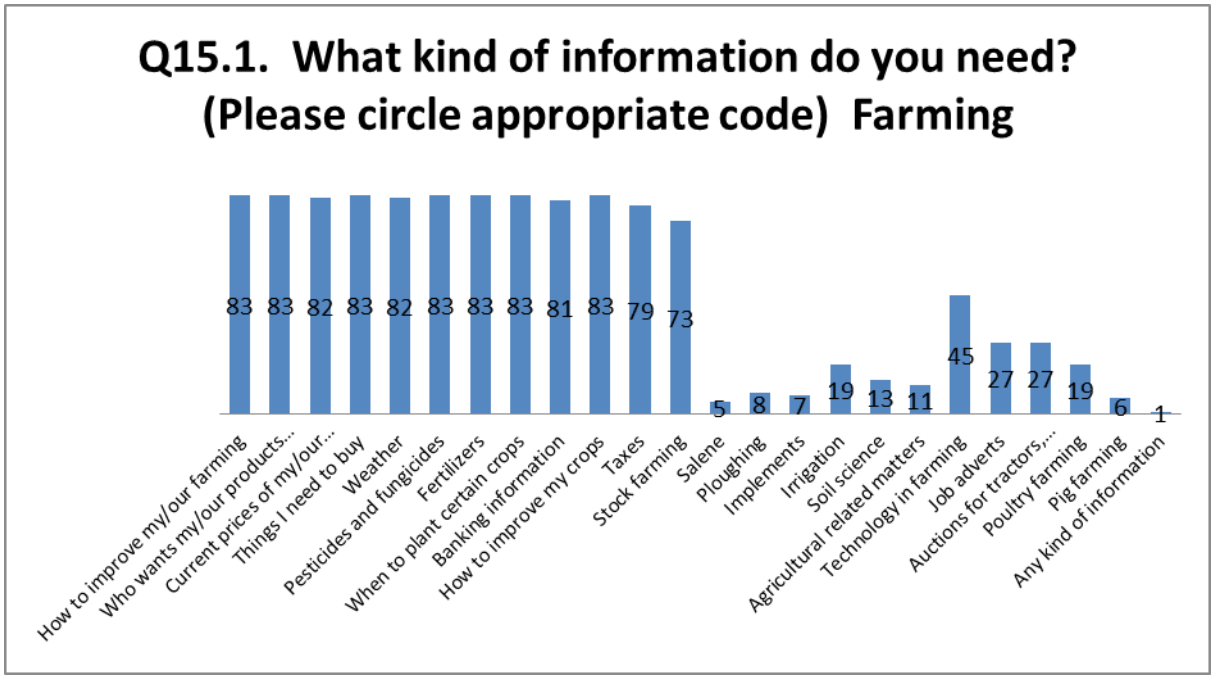
The researcher gave examples of various farming aspects like pesticides and fungicides from which selections could be made for this close ended question.

Table 6.27: Question 15.1

Q15.1. What kind of information do you need? (Please circle appropriate code) Farming	
How to improve my/our farming	83
Who wants my/our products and where	83
Current prices of my/our products	82
Things I need to buy	83
Weather	82
Pesticides and fungicides	83
Fertilizers	83
When to plant certain crops	83
Banking information	81
How to improve my crops	83
Taxes	79
Stock farming	73
Salene	5
Ploughing	8
Implements	7
Irrigation	19
Soil science	13
Agricultural related matters	11
Technology in farming	45
Job adverts	27
Auctions for tractors, implements	27
Poultry farming	19
Pig farming	6
Any kind of information	1
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.27. Question 15.1



Source: Researcher's calculation of question

RESULTS:

The outcome regarding farming requirements was that the farmers needed information in all these categories offered, The highest ratings with 83 respondents were agriculture-related information needs such as on stock farming, taxes, improving my crops, when to plant certain crops, fertilizers, pesticides and fungicides and the weather. Other categories with a high response were technology in farming (45 respondents) and banking information (81 respondents). The low need regarding implements (7 respondents) and ploughing (8 respondents) could be due to the fact that these farmers do not have a high income from the farming in order to buy these implements, as could be seen that the farmers also have jobs other than farming (Question 4) and that their spouses are also working (Question 5).

APPLICATION:

From newspapers such as the *NuFarmer* and the *DAFFNews* which were arranged by the researcher to be obtained by the library for free, as well as the booklets (Appendix L) in the library (Chapter 7, Section 7.4.2.2) information regarding all the above categories on farming was obtained by the farmers as well as the women on social aspects covered by these booklets.

Question 15.2: Other information needed?

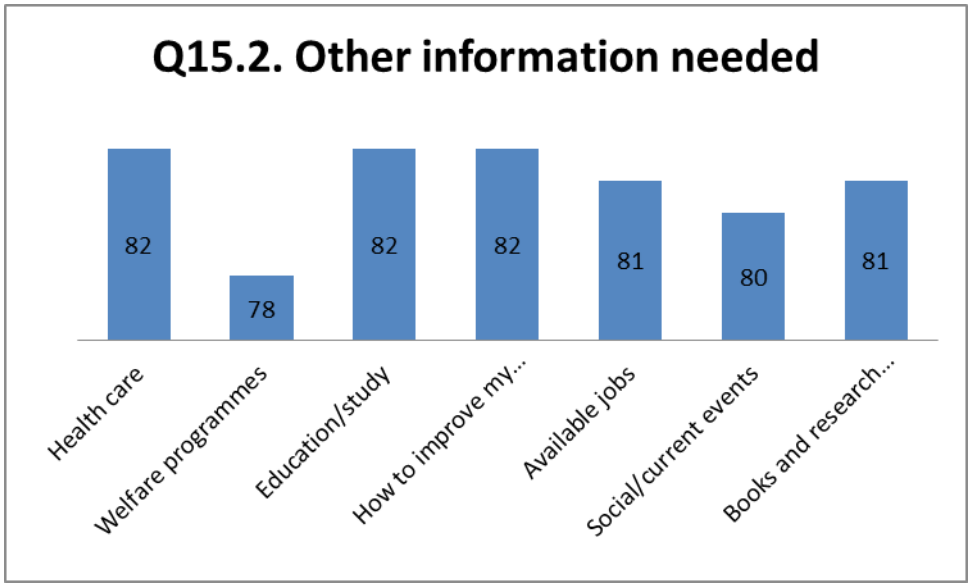
In this close ended question the respondents could chose from several options on which they needed information such as health care, education, social , etc. (multiple).

Table 6.28: Question 15.2

Q15.2. Other information needed	
Health care	82
Welfare programmes	78
Education/study	82
How to improve my business	82
Available jobs	81
Social/current events	80
Books and research studies	81
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.28. Question 15.2



Source: Researcher's calculation of question

RESULTS:

The outcome revealed the high percentages which indicated that there is a positive and urgent need for all these categories other than farming: The needs for health care (82 respondents), how to improve my business (82 respondents) and education (82 respondents) were mentioned as the highest by the respondents. The welfare programmes was rated the lowest, with a high response of 78.

APPLICATION:

The health care and the welfare programmes categories were taken care of by means of the lectures and vaccination by the clinic as explained in Chapter 8 in Sub-section 8.8.1 under the heading Social and cultural sustainability. Information regarding all these categories could also be obtained through the fax and copied with the copier in order to be distributed, as well as from the booklets in the library (Appendix L). The Booklets in the library contained information regarding Social and current events (80 respondents), How to improve my business (82 respondents), Education and study (82 respondents) and Health care (82 respondents) which could be obtained by the farmers and also explained and translated to the farmers by the secretary

Question 16: What else would you like to obtain/send information about?

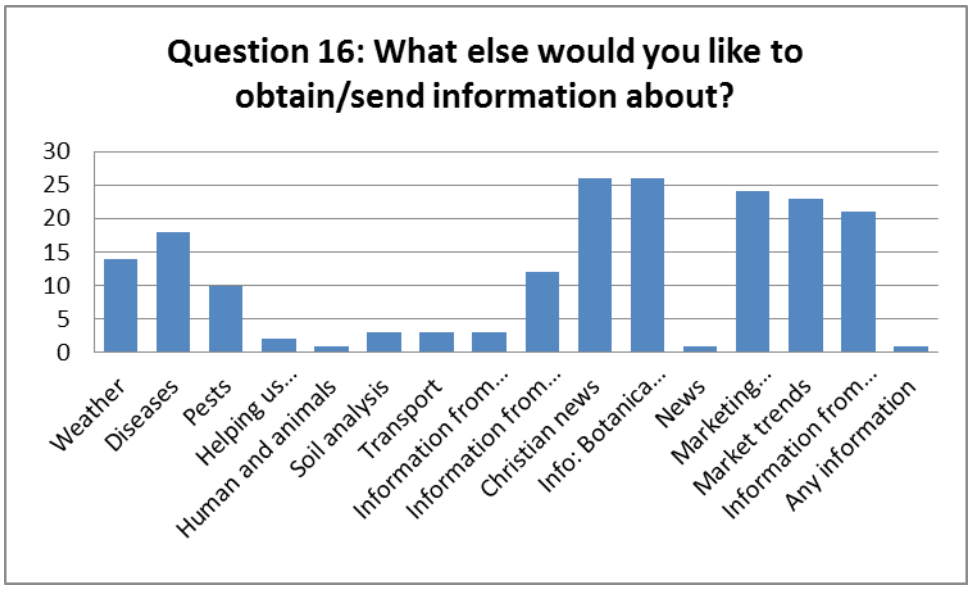
This open ended question was important to note, as there might have been other categories the respondents would like information on.

Table 6.29: Question 16

Q16. What else would you like to obtain/send information about?	
Weather	14
Diseases	18
Pests	10
Helping us (HIV/Aids)	2
Human and animals	1
Soil analysis	3
Transport	3
Information from Department	3
Information from overseas	12
Christian news	26
Info: Botanica Encyclopedia	26
News	1
Marketing information	24
Market trends	23
Information from overseas	21
Any information	1
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.29. Question 16



Source: Researcher's calculation of question

RESULT:

The outcome indicated marketing information (24 respondents) and market trends (23 respondents) as the highest regarding farming aspects. Information regarding the Botanica Encyclopedia (26 respondents) showed the highest priority with News (1 respondent), Human and animals (1 respondent) with the lowest amount of responses. It seems as though only 2 respondents commented on Health aspects, as HIV/Aids were covered in Q 15.2 (1).

APPLICATION:

The farmers obtained information regarding markets (23 respondents), pests (10 respondents) and weather (14 respondents) by means of the telephone, the fax and also from the booklets (Appendix L) in the library which could be explained and translated by the secretary of the telecentre. Information regarding other categories such as Market trends (23 respondents), Information from overseas (21 respondents) and Diseases (18 respondents) could be obtained by means of the telephone and the fax.

Question 17: Which information do you need or would you like to send MOST?

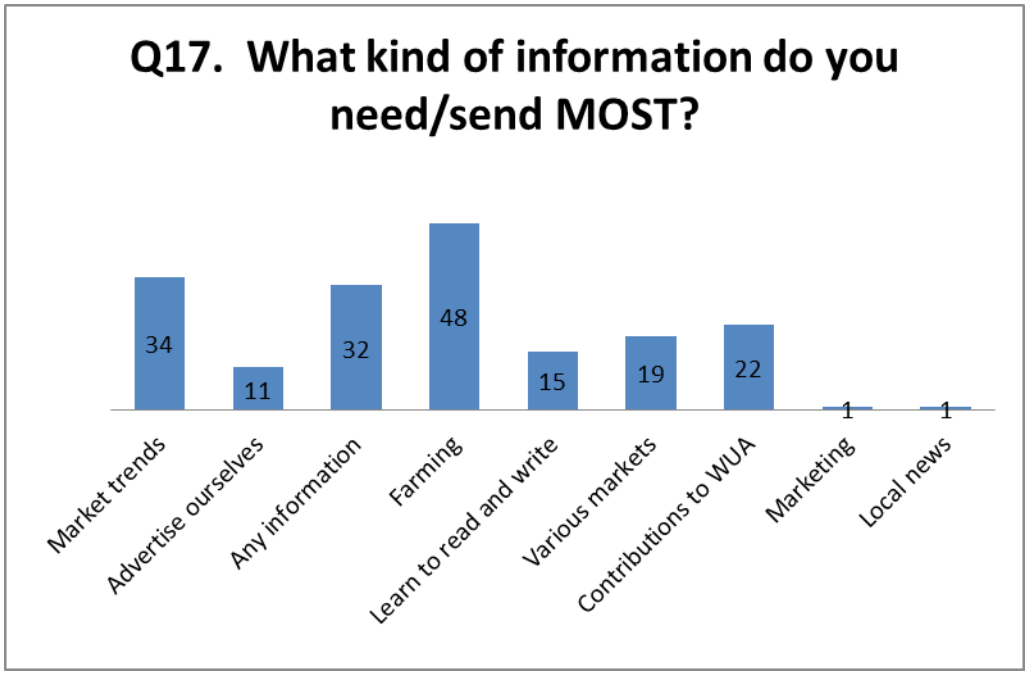
This open ended question was important, as the researcher and the Management Committee felt that, although agriculture-related categories as well as socio-economic categories were presented, there might be other information that could be needed by the farmers. This was also an open ended question suggested by the Management Committee, as they had a brochure (Appendix I) in mind, and they wanted to obtain information on what information the farmers wanted to disseminate most.

Table 6.30: Question 17

Q17. What other of information do you need/send MOST?	
Market trends	34
Advertise ourselves	11
Any other information	32
Farming	48
Learn to read and write	15
Various markets	19
Contributions to WUA	22
Marketing	1
Local news	1
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.30. Question 17



Source: Researcher's calculation of question

RESULT:

The outcome showed the most urgent need was for agriculture-related (farming) information: With the farming category (48 respondents) as the highest with market trends (34 respondents) and contribution to the WUA (22 respondents) as second and third most responses. Any information was also chosen by 32 respondents. The category on to learn to read and write (15 respondents) also indicated that there is a need to become literate by those who cannot read and write. Interesting to note is that marketing was chosen by only 1 respondent, which could be due to the fact that marketing has been mentioned in Question 16 with 24 respondents. The low number of respondents for the marketing categories could also be due to the fact that the farmers well their produce tot the cooperation. Although only

15 indicated that they would like to learn to read and write, they indicated that they needed information on a number of aspects – which could be obtained by reading on the subjects. this might also be the reason for the high number of respondents indicating in the next question that they would like to learn to read and write.

APPLICATION:

The farmers obtained their information regarding market trends from various organisations by means of the telephone and the fax. This information was duplicated by the secretary on the copier and discussed at the following Management meeting. The outcome was typed by the secretary on the computer, duplicated on the copier and distributed to the farmers. Through the co-op they also ordered their farming requirements (Appendix J).

Question 18: If you can not read or write would you like to learn to do this?

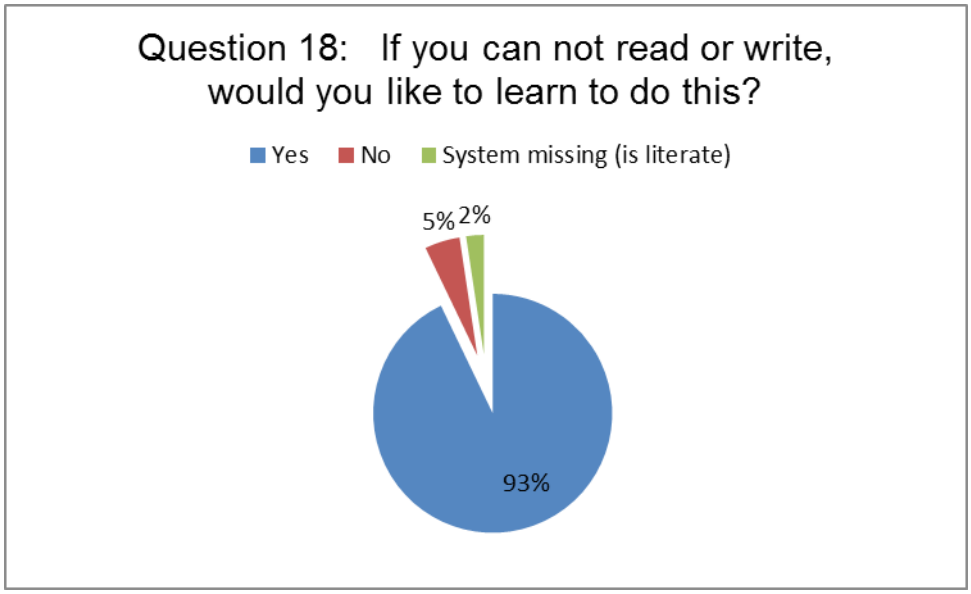
This was important to note, as reading and writing lessons could also be arranged at the nearby college or by the secretary should the respondent want to learn to read or write.

Table 6.31: Question 18

Q18 If you cannot read or write, would you like to learn to do this?		
	Frequency	**Percent**
Yes	78	92.9
No	4	4.8
System missing (is literate)	2	2.4
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure6.31.Question18



Source: Researcher's calculation of question

RESULT:

The outcome showed a positive need by 78 respondents, which might mean that they do want to learn to read or write another language than their own. It is therefore not to say that this 93% cannot read or write at all. Although 50 of the 84 respondents indicated that they are functionally literate in English with Question 11, this could be due to the fact that there could be respondents who wanted to learn some of the other languages as well, as indicated in Question 11. The fact that only 2 respondents did not answer the question – which could means that they are literate – substantiates the definite need to learn to read and write another language as indicated in Question 11 where a need to learn other languages than the home language were indicated.

APPLICATION:

The secretary who is a former school teacher opted to present lessons in reading and writing in English and Tsonga, as explained in the previous Question, Question 17. But eventually she was too busy to be able to assist. She offered to find out from the nearby schools whether they could present lessons, but this proved to be too expensive and another reason

for not realising this need was that the farmers did not have the time to leave their farming practices to go to school.

Question 19: Would you like to learn another language - which?

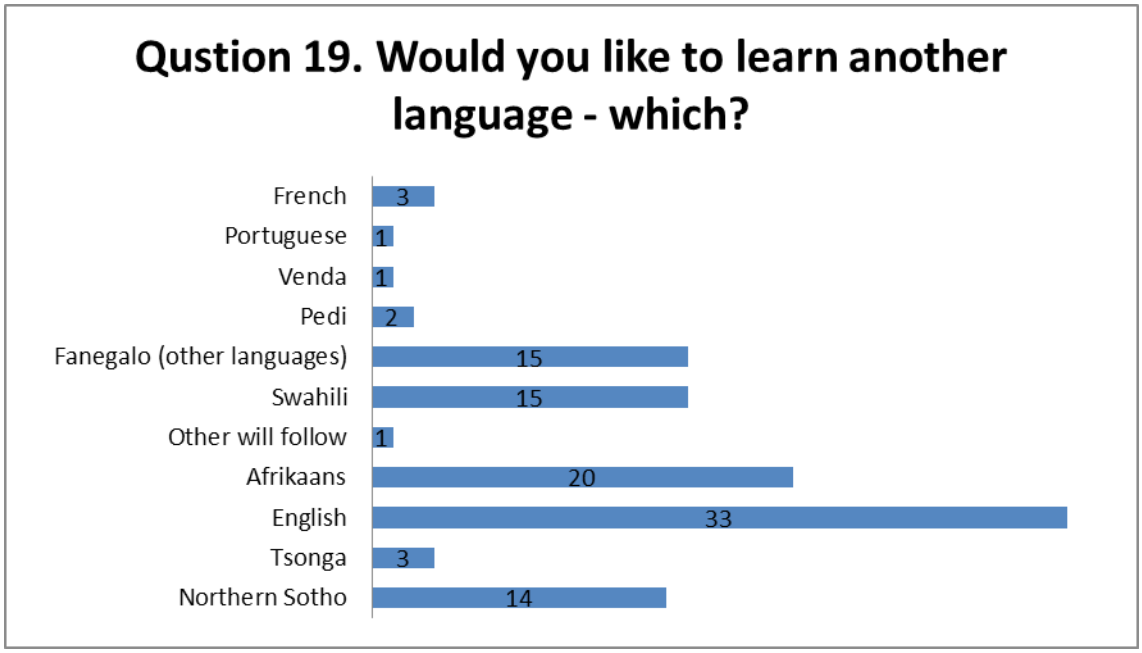
It was important to note whether respondents would like to learn another language, as language lessons could be arranged by the nearby college.

Table 6.32: Question 19

Q19. Would you like to learn another language - which?	
Northern Sotho	14
Tsonga	3
English	33
Afrikaans	20
Other will follow	1
Swahili	15
Fanegalo (other languages)	15
Pedi	2
Venda	1
Portuguese	1
French	3
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.32. Question 19



Source: Researcher's calculation of question

RESULTS:

The outcome indicated the need to learn to read and write English (33 respondents) as well as Afrikaans (20 respondents). It should be noted that in question 11.1, 50 of the respondents indicated that they could read, write or understand English. The high demand expressed for English in this question could therefore be interpreted as a need to improve English writing, reading and understanding of English and that the responses to question 11.1 indicates a very basic and low literacy level in English. A need to learn to read and write African languages such as Swahili (15 respondents) and Northern Sotho (14 respondents) was also indicated. The 'other may follow' indicated by 1 respondent, might indicate that he/she might like to learn another language at a later stage.

APPLICATION:

As explained in the above Questions, the secretary opted to present lessons in English, but she was too busy with the daily running of the telecentre, which lasted from 7:30 in the morning until 17:00 in the afternoon.

The secretary offered to find out from the nearby schools whether they could present lessons in African languages, but this proved to be too expensive and another reason was that the farmers did not have the time to leave their farming practises to go to school.

The researcher and the Vice-Chairman of the Management Committee discussed the matter regarding him presenting lessons in Afrikaans as he was fluent in Afrikaans. These lessons could not realise, as he was, as a farmer, too busy with his daily farming activities and with his duties as Vice-Chairman of the Management Committee.

Question 20: What kind information would you like to give to people outside your community?

This open ended question was important, because this would mean that other information than farming could be sent via fax.

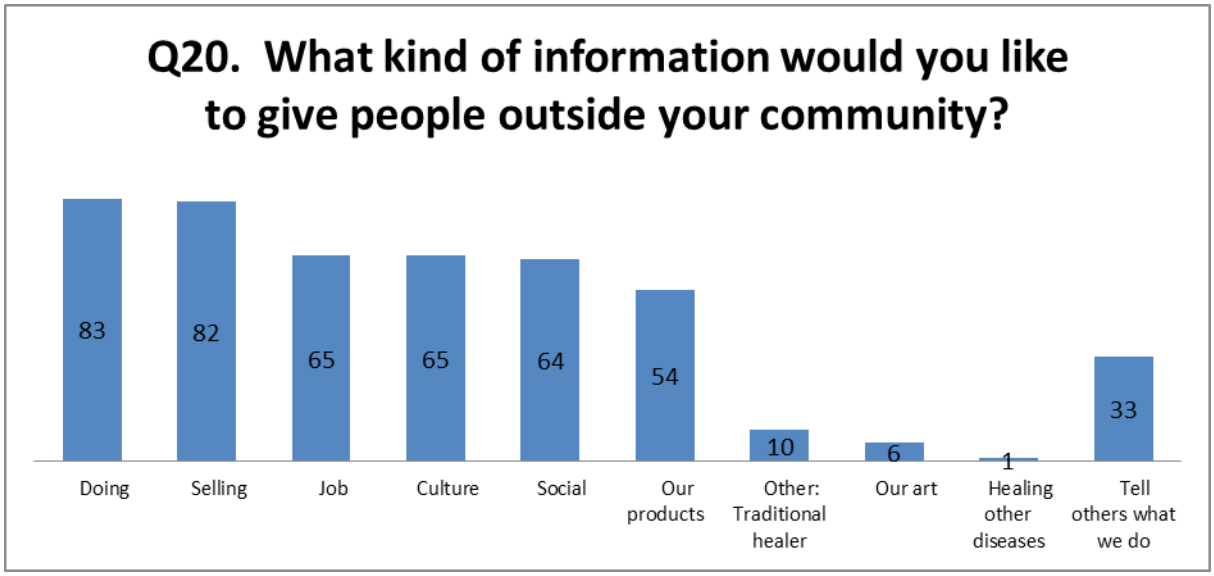
Table 6.33: Question 20

Q20. What kind of information would you like to give people outside your community?	
Doing	83
Selling	82
Job	65
Culture	65
Social	64
Our products	54
Other: Traditional healer	10
Our art	6
Healing other diseases	1
Tell others what we do	33

n = 84

Source: Researchers calculation of data received from questionnaires

Figure 6.33. Question 20



Source: Researcher's calculation of question

RESULTS:

The outcome indicates that the farmers of Thabina definitely want to communicate their information to the outside world. The category on Doing with a 83 respondents as well as the category on selling (82 respondents) shows that the farmers want to inform the peoples outside Thabina of what they are capable of and what their achievements, accomplishments and undertakings are. The categories which indicated as the lowest were the categories on Healing other diseases (1 respondent); our art (6 respondents) and other such as traditional healer (1 respondent). The column 'Doing' might indicate that the respondents would like to communicate what they do, and should be seen as related to the column on 'tell others what we do'.

APPLICATION:

After participatory discussions with and decisions made with Management Committee, the researcher compiled a z-folder brochure on Thabina in assistance with the Management Committee (Appendix I). This brochure was distributed to the surrounding schools and technikon, the NPDALE in Tzaneen and Lenyenye as well as to newspapers such as the *DAFFNews* and *NuFarmer* to be published. The brochure also covered aspects such as the art of the Thabina community and also information on the traditional healer. The Management Committee decided that these locations should be made aware of the practices at Thabina. It was therefore arranged that the Vice-Chairman and a farmer drove to these locations to deliver the brochures (Appendix I) and price list (Appendix M).

Question 21: Do you do business (sell or buy products) with people in:

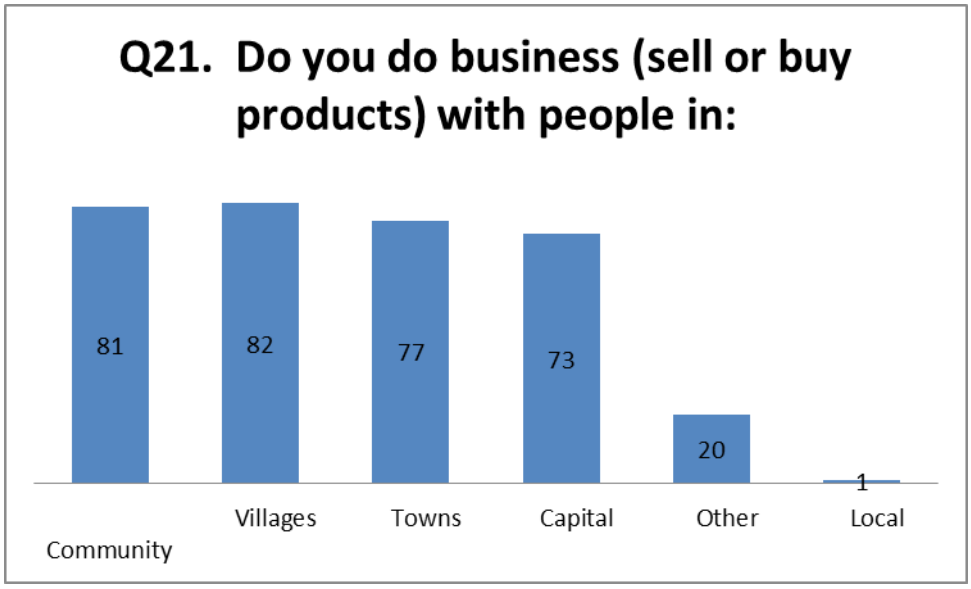
It was important to note whether the respondent trades her/his products only with people in his/her community or elsewhere. Should it be elsewhere, those people had to be informed of the farmer's products.

Table 6.34: Question 21

Q21. Do you do business (sell or buy products) with people in:	
Community	81
Villages	82
Towns	77
Capital	73
Other	20
Local	1
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.34. Question 21



Source: Researcher's calculation of question

RESULTS:

The outcome shows that the farmers do business at several locations such as in the Capital (73 respondents), towns (77 respondents), villages (82 respondents) and at the Thabina community itself (81 respondents). With the 'other', (20 respondents) it was explained to the respondents that a farmer could do business with a cooperation or any other distant village not mentioned.

APPLICATION:

It seems that the farmers not only distribute their products locally, but also through the cooperation to Tzaneen and Pietersburg (Capitals). With the farmers doing business at several locations, the brochure was distributed to the cooperations at these towns and villages. The Vice-Chairman and a farmer drove to these locations to deliver the brochures (Appendix I) and price lists (Appendix M).

Question 22: If you do not have a telephone, why don't you have one?

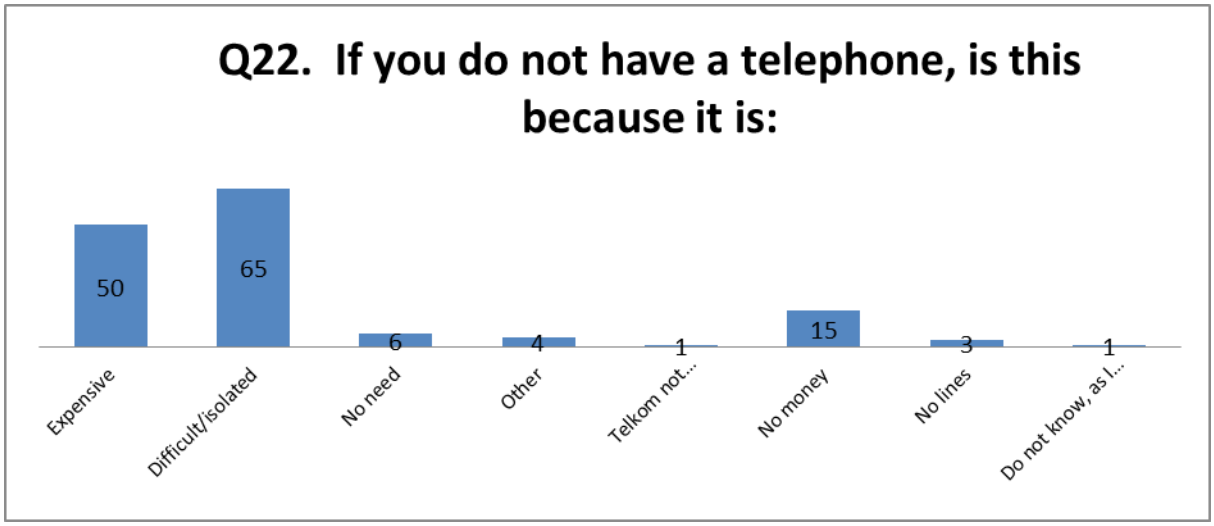
It was important to note whether the respondent had a telephone or not as well as the reason for this, as it would be available to him/her at the telecentre. Should there be a reasonable, or fair number, of farmers that would make use of a telephone but could not afford it, more telephones should be installed at the telecentre.

Table 6.35: Question 22

Q22. If you do not have a telephone, is this because it is:	
Expensive	50
Difficult/isolated	65
No need	6
Other	4
Telkom not provide service	1
No money	15
No lines	3
Do not know, as I am not educated	1
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.35 Question 22



Source: Researcher's calculation of question

RESULTS:

It seemed that the reason for the respondents not to have a telephone was mainly due to the fact they it is difficult because they are isolated (65 respondents), because it was too expensive (50 respondents) and because they had No money (15 respondents). The higher number indicating previously that they have a telephone, might have included the cellphone, as inn this question, it is meant a landline. Only 1 respondent indicated that Telkom do not provide a service, which could be due to the fact that the farm is situated too far from the telecentre. The No need (3 respondents) indicates that the respondent has no need for a telephone, which could also be due to the fact that his spouse, neighbour or children could possess a phone which he might be using.

APPLICATION:

The fact that so many farmers indicated their reasons for not having a telephone, led to the huge number of users of the telephone at the telecentre. The telephone was utilised optimally, as proved with the survey on the usage of the telephone (Appendix N). As one telephone seemed enough, the decision was made not to obtain another phone – also since more than 50% of the respondents also indicated in question 12(a) that they do have a cell phone.

Question 23: Do you read books/magazines?

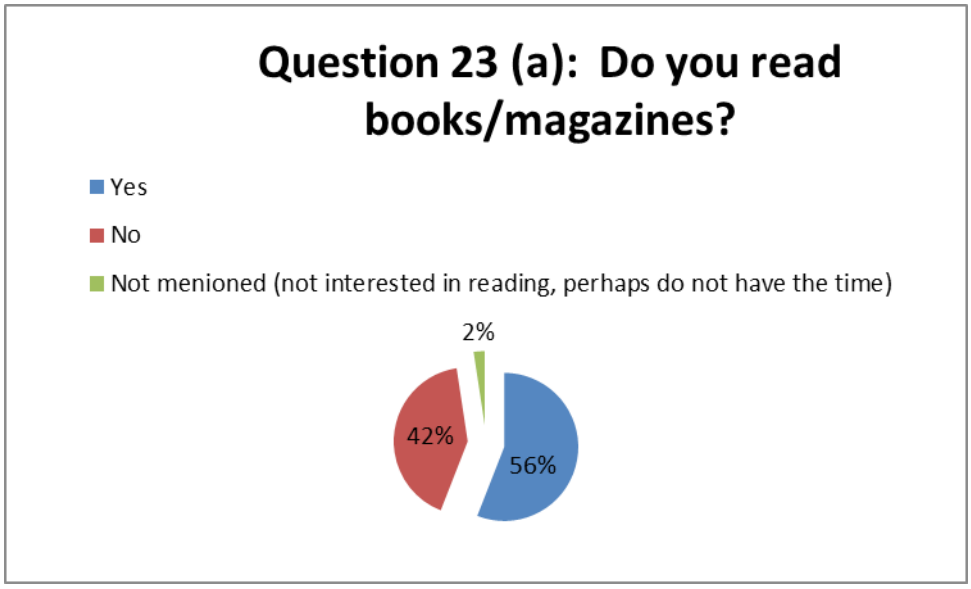
Should the respondent be interested in book/magazines but did not have access to them, such publications could be subscribed to – for the library at the telecentre, as discussed with the Management Committee.

Table 6.36: Question 23 (a)

Q23.1 (a) Do you read books or magazines (Farmer's Weekly, etc.)?		
	Frequency	Percent

Yes	47	56.0
No	35	41.7
System missing (not interested in reading, perhaps do not have time)	2	2.4
Total	84	100.0
n = 84		
Source: Researchers calculation of data received from questionnaires		

Figure 6.36. Question 23 (a)



Source: Researcher's calculation of question

RESULTS:

The outcome shows a close correlation between those who read books/magazines (56%) and those who do not read (42%) which substantiates the high number of those indicated that they would like to learn to read and write (question 18). Only 2 respondents did not complete this question, which might be due to the fact that they are not interested in reading or that the do not have the time.

APPLICATION:

With more than the half of the respondents indicating that they do read books/magazines, the matter was discussed with the Management Committee. The outcome was that the researcher contacted agriculture-related magazines such as the *Landbouweekblad* and the *Farmers Weekly*. The researcher tried to subscribe to these magazines for free, but in vain. The outcome was that the telecentre, on the month it would have enough funding, buy these magazines from the nearest village, Lenyenye.

Question 23 (b) Which books do you read?

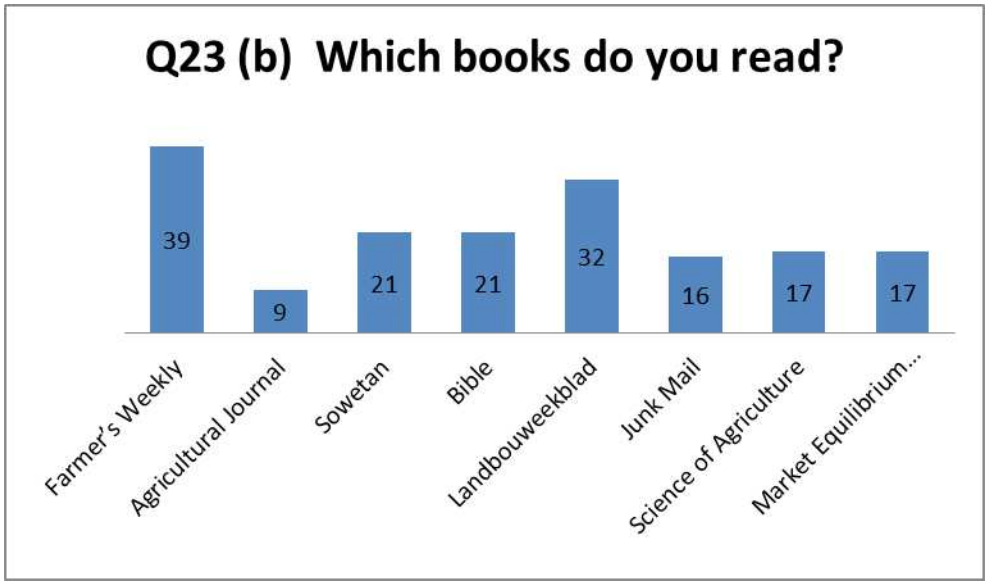
This open ended question could provide information regarding subscriptions by the library should it be affordable. Should the respondent be interested in newspapers, this could also be subscribed to by the telecentre and placed in the library at the telecentre. This open ended question was also suggested by the Management Committee in order to identify which books could be afforded by the library.

Table 6.37: Question 23 (b)

Q23 (b) Which books do you read?	
Farmer's Weekly	39
Agricultural Journal	9
Sowetan	21
Bible	21
Landbouweekblad	32
Junk Mail	16
Science of Agriculture	17
Market Equilibrium Book	17
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.37. Question 23 (b)



Source: Researcher's calculation of question

RESULTS:

The magazines read most was the *Farmers Weekly* (39 respondents) with the *Landbouweekblad* (32 respondents) indicated the respondent's need for agriculture-related information. Important to note is the fact that 32 respondents indicated that they read the *Landbouweekblad.* The reason being that members of a certain Afrikaans literate household read such books, i.e. the *Landbouweekblad* which is in Afrikaans, and they then again read and explain it to the illiterate respondent. The other magazines and newspapers had more or less the same percentage of readers such as the Market Equilibrium Book (17 respondents), the Science of Agriculture (17 respondents), Junk Mail (16 respondents) and the Agricultural Journal a low 9 respondents.

APPLICATION:

This outcome indicated that the farmers chose to read the *Farmers Weekly* and the *Landbouweekblad* the most. Although only 9 respondents indicated in question 11.6 that they can read Afrikaans, the secretary translated the Afrikaans articles applicable to their farming activities, to the farmers in the indigenous language. These translations were quite successful and in demand, as the farmers mentioned that the *Landbouweekblad* features different articles as the *Farmers Weekly,* which they enjoyed and discussed among themselves. As indicated in Question 23(a), the researcher tried to subscribe to these magazines for free, but in vain. The outcome was that the telecentre, on the month it would have enough funding, buy these magazines from the nearest village, 38 Lenyenye. The *Junk Mail* and the *Sowetan* were bought from Lenyenye when the telecentre had enough funds.

Question 23.1: If no, why?

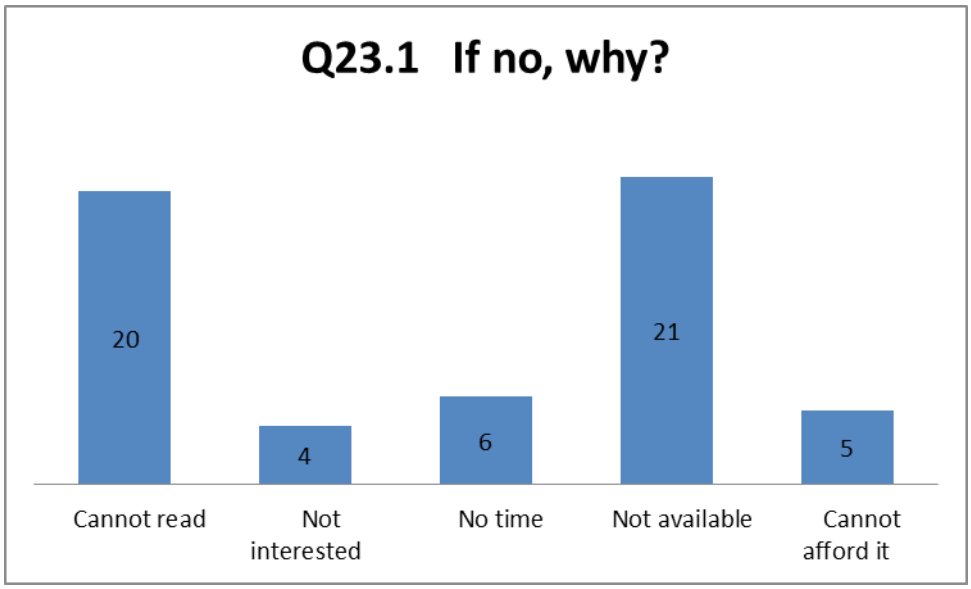
It was important to note **why** the respondent does not read books. Should the farmers not be interested in reading newspapers, the telecentre should not subscribe to books/magazines. Should the reason be that the respondent could not read, language lessons could be considered as mentioned in Question 19.

Table 6.38: Question 23.1

Q23.1 If no, why?	
Cannot read	20
Not interested	4
No time	6
Not available	21
Cannot afford it	5
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.38. Question 23.1



Source: Researcher's calculation of question

RESULTS:

21 of the respondents indicated that they do not read due to the fact that the books/magazines are not available. The category on Cannot read (20 respondents) meant that these respondents were illiterate. This figure could be related to the question regarding Functional literate, since 23 respondents of Shangaan (most spoken indigenous language with 62 respondents) indicated that they are not literate. This response could be referred to Question 18, where a high 93% of respondents indicated that they would like to learn how to read and write, which might be, as explained, that there are respondents which would like to learn to read and write languages other than their mother tongue. The No time category (6 respondents) indicated that the farmer is either full time busy with his farming activities, has

a full time job or part time job as well or busy with various other activities *inter alia* as arts and crafts.

APPLICATION:

This situation led to the farmers utilising the library (Appendix L) optimally in order to read and also to make copies of the information needed on the copier. Sometimes, when the library had the funds, the library also bought agriculture-related magazines which were made good use of by the farmers.

Question 24: Which newspapers do you read?

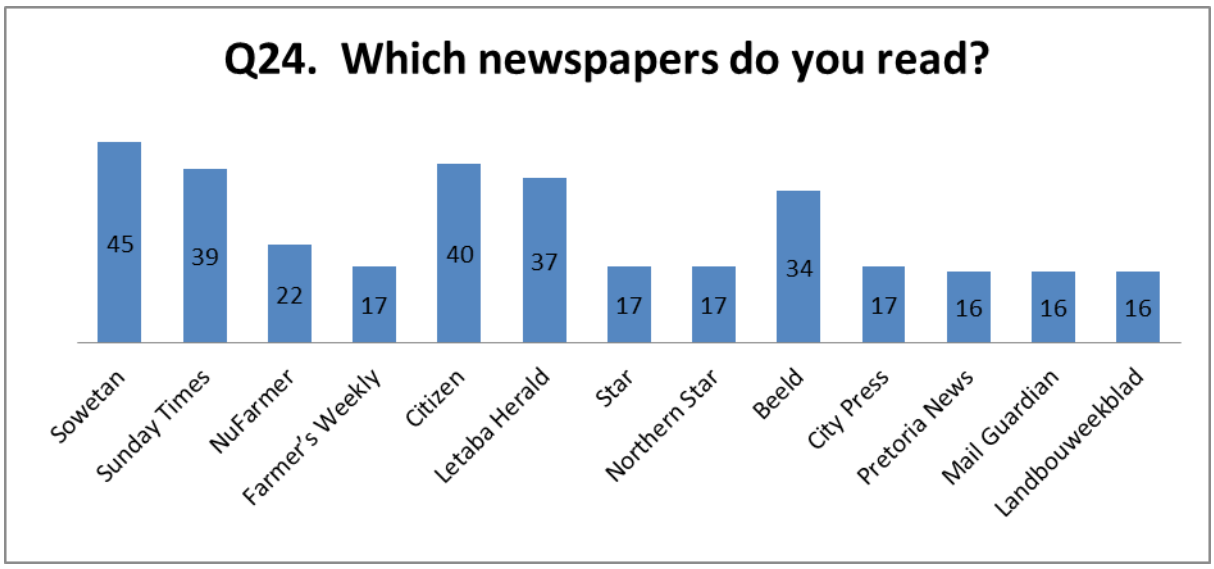
This open ended question would indicate whether the respondent is interested in newspapers, because it could also be subscribed to by the library if affordable.

Table 6.39: Question 24

Q24. Which newspapers do you read?	
Sowetan	45
Sunday Times	39
NuFarmer	22
Farmer's Weekly	17
Citizen	40
Letaba Herald	37
Star	17
Northern Star	17
Beeld	34
City Press	17
Pretoria News	16
Mail Guardian	16
Landbouweekblad	16

Source: Researchers calculation of data received from questionnaires

Figure 6.39. Question 24



Source: Researcher's calculation of question

RESULTS:

With the *Sowetan* read the most (45 respondents), it proved that the farmers who are literate chose to read features regarding their own outlooks and viewpoints. The *Letaba Herald* (37 respondents), the *Citizen* (40 respondents) and the *Sunday Times* (39 respondents) proved to be the second popular newspapers chosen to be read. Interesting to note is the Afrikaans *Beeld* (34 respondents) that is also read by the farmers. Important to note is the fact that the high amount of respondents reading the *Beeld*, is because some members of a household could read these newspapers and they then again read and explain it to the illiterate respondent. The rest of the categories indicated to be more or less the same popularity.

APPLICATION:

The Management Committee decided that once the telecentre has enough funds, it would describe to the *Sowetan, Citizen* and the *Sunday Times*. With the *NuFarmer* read by a near 22 respondents, the researcher subscribed to the *NuFarmer* to be delivered for free. As the *NuFarmer* is aimed at the small-scale farmer as such, much information and ideas strategies for farming were found in this popular newspaper. The *Letaba Herald* would be fetched by any farmer who visit the nearby villages, as it is for free. Although only 9 respondents indicated in question 11.6 that they can read Afrikaans, the secretary translated the Afrikaans articles applicable to their farming activities and those they are interested in, to the farmers in the indigenous language.

Question 25: If you do not read newspapers, why not?

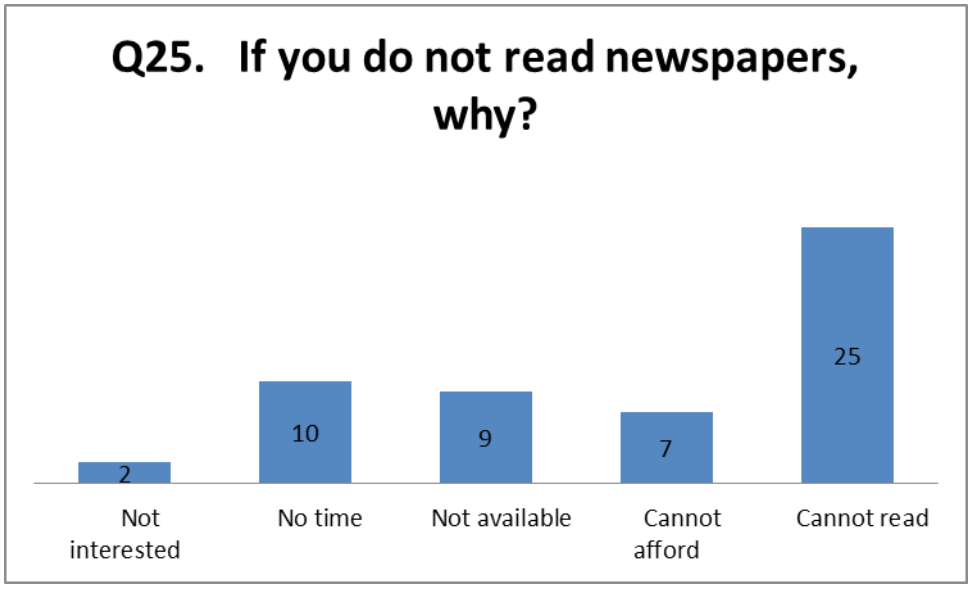
It was important to note **why** the respondent does not read newspapers. Should the farmers not be interested in reading newspapers, the telecentre should not subscribe to newspapers. Should the reason be that the respondent could not read, language lessons could be considered as mentioned in Question 19.

Table 6.40: Question 25

Q25. If you do not read newspapers, why?	
Not interested	2
No time	10
Not available	9
Cannot afford	7
Cannot read	25
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.40. Question 25



Source: Researcher's calculation of question

RESULTS:

It was envisaged that one farmer does not read for more than one reason. Although 20 respondents indicated in question 23.1 that they cannot read, 25 of the respondents indicate here that they cannot read. This might be due to the fact that the extra 5 respondents did not complete the Cannot read category in question 23.1 or that they now, later in the interview schedule, realised what the question entails, or that the translator now explained the question. The No time category (10 respondents) indicated that the farmers are too busy with their farming practices: They are either farming full time (Question 4.1) or they have another job as well (where 7 categories were indicated in Question 4.2), or they are busy with the children, their arts and crafts, household activities, etc. A mere 2 respondents indicated that they are not interested, which could be because they are busy farming or they cannot read.

APPLICATION:

As lessons in literacy at the school proved to be too expensive (Question 18), read and write classes by the secretary (Question 17, 18 and 19) or the Vice-Chairman (Question 19) were proposed by the Management Committee, but it did not realise, as neither the secretary not the Vice-Chairman had time to present these classes.

Question 26: Do you listen to the radio?

This question was asked in order to determine how many respondents have access to ICT such as a radio.

Table 6.41. Question 26.

Q26: Do you listen to the radio	
Yes	82
No	2
n = 84	

Source: Researchers calculation of data received from questionnaires

RESULT:

A Figure is not necessary for this Question, since only 2 farmers indicated that they do not listen to the radio, and the most of the respondents (82) listen to the radio and indicated their station and programme in the next Question:

Question 26.1: Which station and programme do you listen to?

Table 6.41: Question 26.1

Ward A	Radio Tobela: Fm news
	LM Radio
Ward B	Radio 2000
Ward C	Munghana Lamene (agricultural)
	Jacaranda (Social programmes)
Ward D	Munghana Lomene
	Tobela Fm
	Jacaranda
	Greater Tzaneen

Source: Researchers calculation of data received from questionnaires

RESULTS:

As all Wards indicated various programmes to listen to, it was envisaged that a farmer could listen to various of these programmes. Interesting to note is that Ward B indicated that they only listen to Radio 2000, which could be due to the fact that Radio 2000 is the only reception they receive at their location. This outcome indicated that although the farmers indicated that they mostly need agriculture-related information, this outcome indicated that they also need socio-economic information, since these programmes offered talk shows, music and other social-related information than farming.

APPLICATION:

The outcome also means that the farmers do have access to agriculture-related information as well as socio-economic information. But the Management Committee decided that the library should still order the newspapers and magazines, to be available to the farmers.

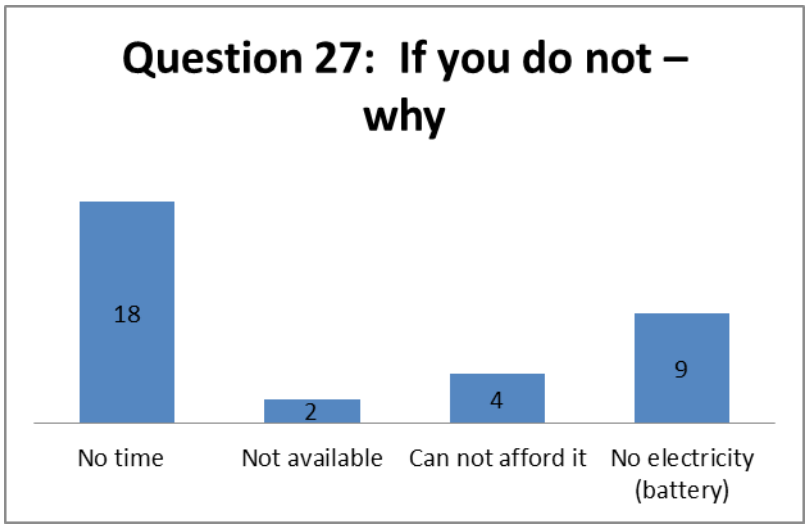
Question 27: If you do not – why

Table 6.42: Question 27

Question 27: If you don't listen to the radio, why not?	
No time	18
Not available	2
Can not afford it	4
No electricity (battery)	9
n = 84	

Source: Researchers calculation of data received from questionnaires

Figure 6.41. Question 27



Source: Researcher's calculation of question

RESULT:

Most of the respondents who do not listen to the radio (18) indicated that they do not, due to the fact that they do not have time. It could be concluded that they are mostly busy with their farming practices. 9 respondents indicated that they have no electricity and are therefore using batteries, which they do not always have available.

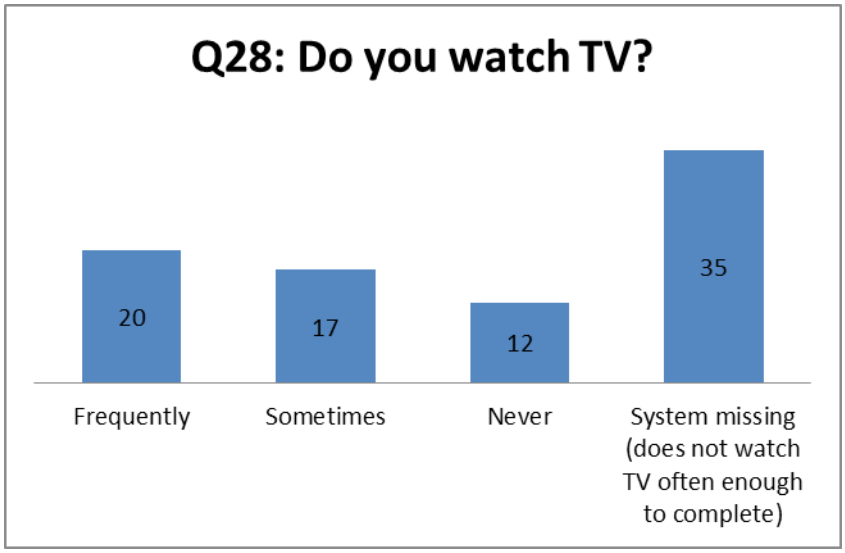
Question 28: Do you watch TV?

Table 6.43: Question 28

Q28: Do you watch TV?		
	Frequency	**Percent**
Frequently	20	23.8
Sometimes	17	20.2
Never	12	14.3
System missing (do not have a TV)	35	41.7
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.42. Question 28



Source: Researchers calculation of data received from questionnaires

RESULTS:

A high number of 35 respondents (42%) did not indicate whether they watch TV, which could mean that they are either busy with other activities in their household, job or farming, or that they do not own a TV. This outcome indicated that the number of respondents that watch TV frequently is 20. Those who watch TV sometimes (17) are close to the Frequently (20), which means that some farmers definitely are in a position to watch TV. The category indicated Never is 12 respondents. The Systems missing could be due to the fact that the respondent did not feel to complete this question as he/she does not watch TV often enough to complete, since the respondent might be full time farming (Question 4.1), has a part time job (Question 4.4) or that they do not own a TV or have power to do so.

APPLICATION:

Since most respondents do have access to a TV, a TV was not considered for the telecentre.

Question 28.1: Which programmes do you like most?

Table 6.44: Question 28.1

Ward A	Farming programmes
	50/50
Ward B	50/50
	news
	weather;
	Laduma
Ward C	Mopani Station (TV 2) : Local affairs

Source: Researchers calculation of data received from questionnaires

RESULTS:

All three these Wards indicated that they watch agriculture-related programmes such as 50/50, news, and Mopani. No comment was received from Ward D, which could mean that they are either located too far from the power grid to be able to watch TV, that they do not have reception or that they did not complete the question.

APPLICATION:

With the respondents being farmers and watching agriculture-related programmes, the researcher suggested a programme regarding Thabina WUA to be broadcasted during one of these programmes watched by the farmers. This led to a documentary on the Thabina WUA and the telecentre on the Mopani TV programme.

Question 29: If you do not watch TV, why?

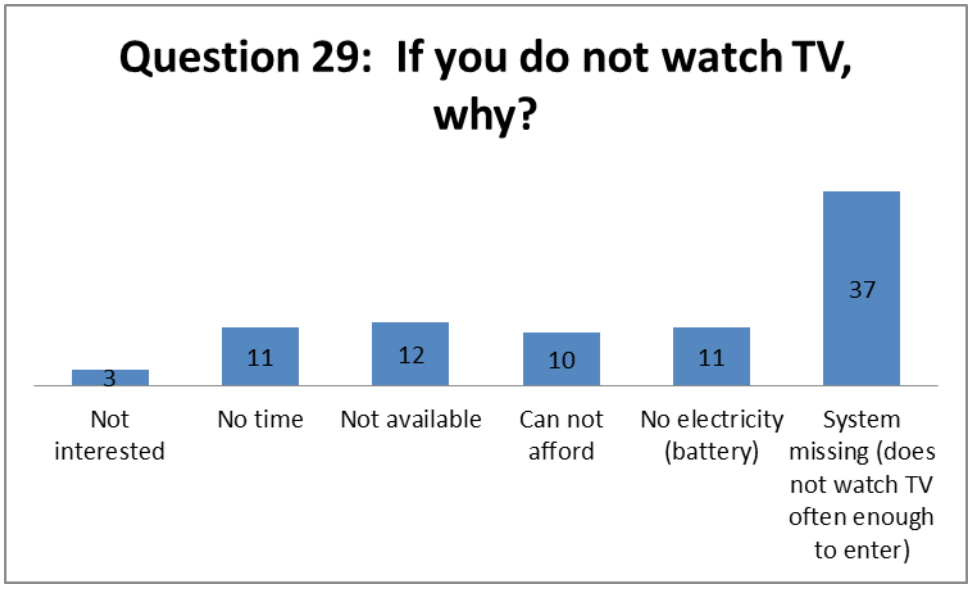
It was important to note the reason why they do not watch TV.

Table 6.45: Question 29

Q29. If you do not watch TV, why not?		
Not interested	3	8.3%
No time	11	30.6&
Not available	12	33.3%
Can not afford	10	27.8%
No electricity (battery)	11	30.6%
System missing (does not watch TV often enough to enter)	37	130.6%
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.43. Question 29



Source: Researcher's calculation of question

RESULTS:

It was envisaged that one farmer could choose more than one of these reasons. With Not available (12 respondents) as the most and No electricity (11 respondents) it could be noted that a farmer could mention both these categories as answers. But a main issue here was that the farmers do not have power to watch TV. It could be concluded that the high number of 37 respondents who did not complete the question, The Systems missing could be due to the fact that the respondent did not feel to complete this question as he/she does not watch TV often enough to complete, since the respondent might be full time farming (Question 4.1), has a part time job (Question 4.4) or that they do not own a TV or have power to do so.

APPLICATION:

Since so little respondents do not watch TV, a TV was not considered for the telecentre.

Question 30: If you have access to a computer, what would you use it for?

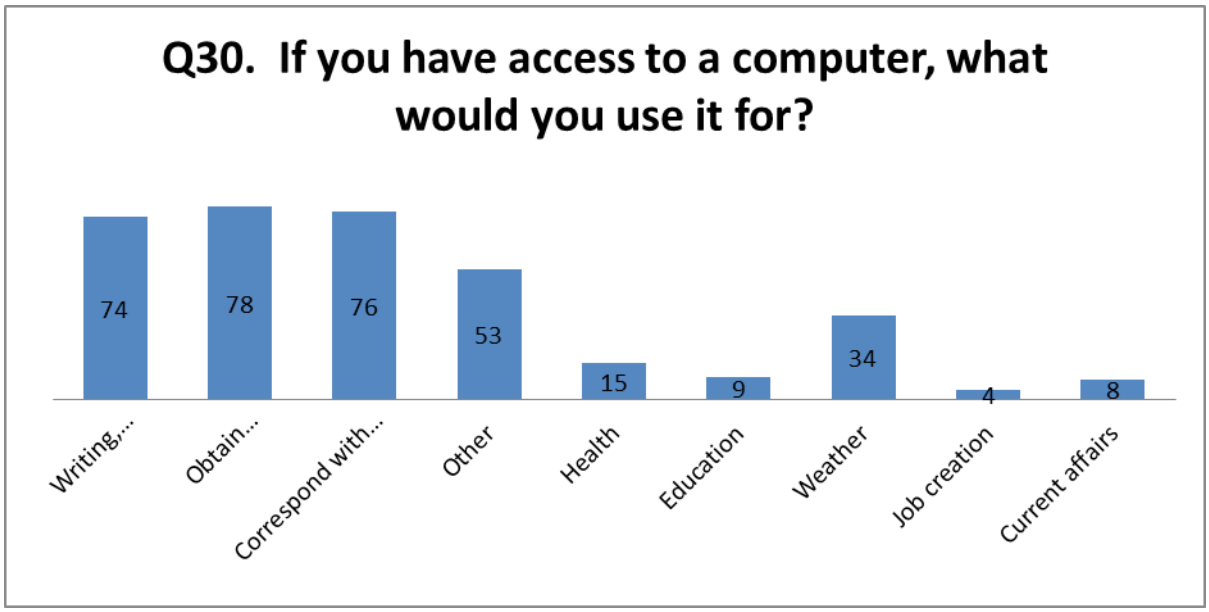
It was important to note what the respondent would use the computer ("machine", as it was called by the farmers) for. If necessary, the farmers should be trained in the various uses of the ICT.

Table 6.46: Question 30

Q30. If you have access to a computer, what would you use it for?		
Writing, communication (word processing)	74	91.4%
Obtain information on farming (Internet)	78	96.3%
Correspond with other agriculture-related organisations	76	93.8%
Other	53	65.4%
Health	15	18.5%
Education	9	11.1%
Weather	34	42.0%
Job creation	4	4.9%
Current affairs	8	9.9%
Store each farmer's file in machine	30	37.0%
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.44. Question 30



Source: Researcher's calculation of question

RESULTS: The high numbers indicated show that a farmer indicated more than one category. Only a few respondents would use the information and communication technologies for health care (15 respondents). With the Obtaining of farming information (78 respondents) and the Weather (34 respondents), indicated that as farmers, the respondents do have a specific need for agriculture-related information. It was interesting to note that the Writing, communication (74 respondents), Correspond with other (76 respondents) and the Obtain information (78 respondents) showed that the respondents were aware of the various applications of the computer, which could be due to the explanation of the information and communication technologies during the demonstration of the information and communication technologies.

APPLICATION:

With such a low need for health care information (also only 2 out of a 84 in question 31) might be due to the fact that various pamphlets on health care was available in the library. But the secretary organised with the nearby clinic that all the children were vaccinated as well as for lectures regarding various health care aspects. The Library (Appendix L) also had brochures and pamphlets on health care which the secretary explained to the farmers when needed.

Question 31: What other sources of information do you need?

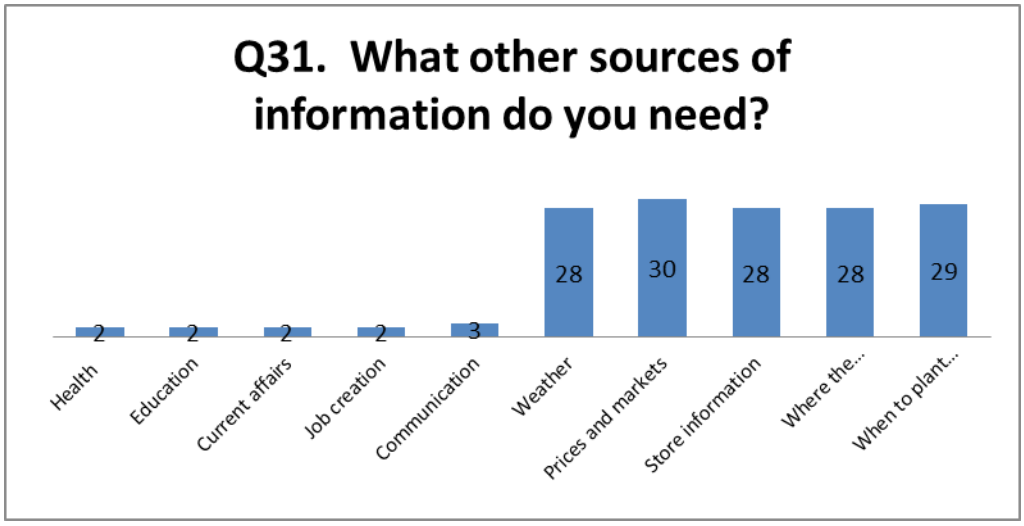
This open ended question was seen as important by the Management Committee, as the meeting felt that the answers would indicate socio-economic needs as well. Should there be any other social need not covered in this section, it could be mentioned here.

Table 6.47: Question 31

Q31. What other sources of information do you need?		
Health	2	5.6%
Education	2	5.6%
Current affairs	2	5.6%
Job creation	2	5.6%
Communication	3	8.3%
Weather	28	77.8%
Prices and markets	30	83.3%
Store information	28	77.8%
Where the markets are	28	77.8%
When to plant what	29	80.6%
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.45. Question 31



Source: Researcher's calculation of question

RESULTS:

The outcome presented a need for agriculture-related information, regardless that it was mentioned in the previous Question, Question 30: Prices and markets a 30 respondents; When to plant with 29 respondents; as well as with Where the markets are and Weather both 28 respondents. To store information with a high number of 28 respondents showed that the respondents knew of the applications of the computer. Socio-economic needs were low rated in this Question. This could be, although the question asked 'other types', due to the fact that the farmers urgently need agriculture-related information. Health care and education was each mentioned by only 2 respondents, which could be due that these questions were covered in other questions.

APPLICATION:

The Management Committee once again urged the researcher that the information and communication technologies to address these needs should quickly be integrated with those information and communication technologies needed for the agriculture-related technologies in order to be able to be purchased as soon as possible. The Management Committee urged the researcher to urgently commence to try to find funds to purchase the information and communication technologies.

Question 32: Do you have to travel to another town/village for access to ICT's?

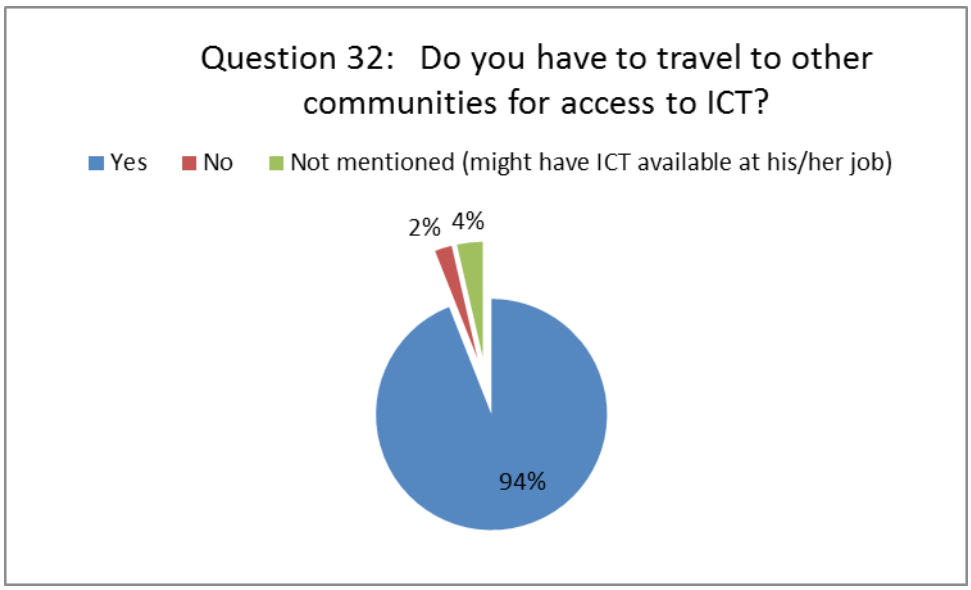
It was important to note whether the respondent had to travel to another village/town/city for access to ICT. Should the farmer have to travel, he might rather decide to use the telecentre, which would be nearer. Should the answer be a 'Yes', the following questions would be relevant.

Table 6.48: Question 32

Q32. Do you have to travel to another town/village for access to ICT's?		
	Frequency	**Percent**
Yes	79	94.0
No	2	2.4
System missing (might have ICT available at his/her job)	3	3.6
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.46. Question 32



Source: Researcher's calculation of question

RESULTS:

The outcome shows that a 94% of the respondents had to travel to other communities in order to access the information and communicate technologies. The 2% who indicated that they do not have to travel, might have been due to the fact that their Ward is situated close to the telecentre, or that they might have a computer available at work, such as the small number of respondents that indicated in Questions 4.1 and 4.2 that they have sources of income from other work activities.

APPLICATION: This outcome was of great concern to the Management Committee, especially because they knew that the farmers make use of public transport which was quite expensive. The Management Committee insisted that the matter regarding the obtaining of the information and communication technologies at the telecentre should be undertaken as soon as possible. The result was that the researcher did obtain funds and soon after these discussions the information and communication technologies were bought and installed as explained in Chapter 7, with the Implementation Phase. Although some Wards were located far from the telecentre, the farmers walked the distance or came by donkey carts.

The following questions are summarised below – as noted in field-notes (Appendix G):

Table 6.49: Questions 33 – 38 summarised

Distances and costs				
WARD	**TOWN/VILLAGE**	**DISTANCE**	**TIME**	**COSTS**
A	Lenyenye	3 km.	1 hour	R6.24
	Rita	2 km.	30 minutes	walk
	Tzaneen	25 km.	1 hour	R10.00
B	Tzaneen	30 km	30 minutes	R8.00
	Letsitele	10 km	15 minutes	R5.00
	Nkowa	10 km.	15 minutes	R8.00
C	Lenyenye	4 km.	1 hour	R5.00
	Letsitele	10 km.	1/2 hour	R3.00
	Tzaneen	20 km.	1 hour	R5.00
D	Letsitele	12 km.	30 minutes	R4.00
	Tzaneen	30 km.	30 minutes	R19.00
	Lenyenye	6 km.	30 minutes	R9.00

Source: Researcher's participatory discussions and field notes

RESULTS:

The answers to this open-ended question were noted by the researcher on field-notes taken. The distances the farmers had to travel varied between 2 km to 30 km. This was due to the fact that some Wards (C and D) were situated much higher up along the Thabina canal, and therefore much further from the telecentre, which also led to the higher costs. This could be explained by using Tzaneen as example: To travel to Tzaneen would Cost Ward A a R10.00, Ward B a R8.00, Ward C a R5.00 and Ward D a R19.00.

APPLICATION:

The outcome was the same as with Question 32. The Management Committee saw the establishment of the telecentre as an urgent concern, and the telecentre was established soon after these discussions on the outcome of the interview schedule in order to provide the farmers with the necessary information and communication technologies to address their agriculture-related needs as well as their socio-economic needs.

Question 39: Would you travel less if you had access in your community to the ICT's?

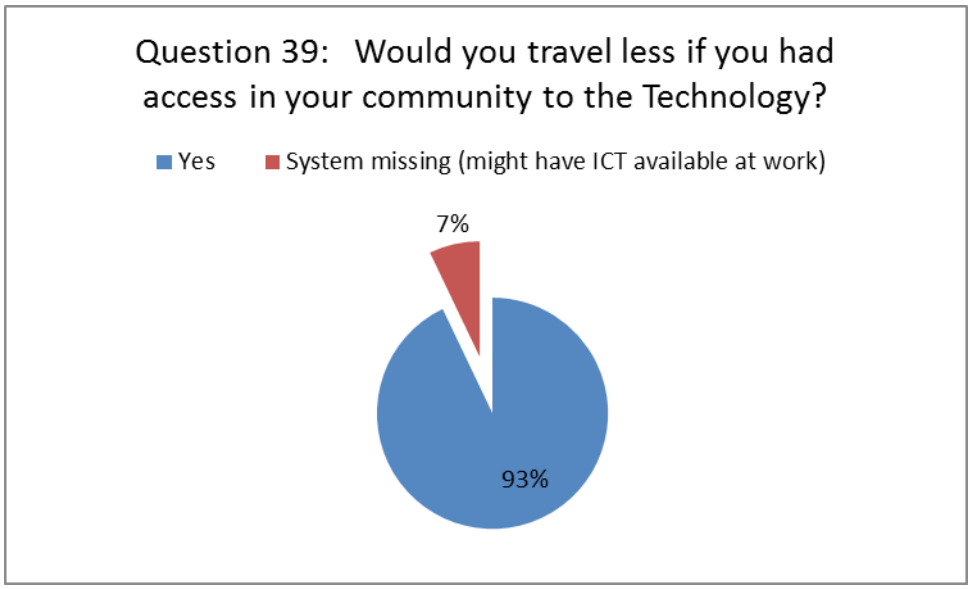
If the answer was in the affirmative, the respondent would rather make use of the telecentre, than travel further in order to reach information and communication technologies at another location.

Table 6.50: Question 39

Q39. Would you travel less if you had access in your community to the ICT's?		
	Frequency	**Percent**
Yes	78	92.9
System missing (might have ICT available at work)	6	7.1
Total	84	100.0
n = 84		

Source: Researchers calculation of data received from questionnaires

Figure 6.47. Question 39



Source: Researcher's calculation of question

RESULTS:

The 93% respondents indicating that they would have to travel less should they have access to the technology at their community, was the final indication to the Management Committee of the much needed telecentre to provide these farmers of Thabina irrigation scheme with the necessary and essential information and communication technologies. There were no respondents who indicated a 'no' and only 7% did not comment, which could mean that they do have ICT available at work.

APPLICATION:

The Management Committee decided the four-phase participatory process could commence to the next Phase, which was the Establishment Phase, Phase 3. The telecentre was established and the technologies were optimally used as presented in Appendices O and P.

Participatory discussions with the Management Committee

During the various participatory discussions on the interview schedule and the findings as presented above the Management Committee mentioned that they at first thought that the interview schedule was too long, but after the researcher explained that translators would be used for explanatory purposes, they all agree that the translation of the questions into the indigenous language and the translators assisted and supported the interviewing to be successful.

The Management Committee confirmed and declared that the findings proved to be the socio-economic needs and ICT needs of the farmers of the Thabina irrigation scheme. This was due to the fact that questions relevant to socio-economic needs and ICT needs of the farmers of the Thabina irrigation scheme were formulated and proposed by them and the Extension Officer during the compilation of the interview schedule. Aspects the Management Committee discussed in detail included the high percentage of farmers that understood English (question 11); the definite need for a clinic (question 13); the telephone and the copier as indicated as the most important ICT (Question 13); Agricultural information needed regarding future farming, ordering from co-ops by means of the telephone and to obtain market prices (question 14); conditions such as theft, crime, lack of services (question 14.2.1); the most important agriculture-related information needed (question 15.1); and social needs such as health care (question 15.2), HIV/aids and Christian news (question 16.1), to learn to read and write (question 17) especially English (question 19) and to subscribe to the *Farmers Weekly* and the *Landbouweekblad* (question 23.1c) and the *NuFarmer* (Question 24). Other aspects to note were that the farmers mostly do business with surrounding villages, that they would need the computer for communicating and writing as well as to correspond with other agriculture-related organisations (question 30) and that they now have to travel distances in order to access a computer (question 32). This problem on the distances to travel to obtain the information and communication technologies was addressed by the establishment of the Thabina telecentre at the Thabina irrigation scheme.

The Management Committee saw the outcome of the interview schedule as a true indication and conclusion of the socio-economic needs and ICT needs of the farmers of the Thabina irrigation scheme. The researcher and the Management Committee decided that to address

these socio-economic needs and ICT needs of the farmers, a telephone, a multifunctional printer and a computer would be needed.

The Management Committee saw that addressing of the various problems indicated in the outcome of the interview schedule as important. These matters included the lectures on health care and vaccinations by the nearly clinic; the compilation and distribution of a brochure containing the agriculture-related, the socio-economic and ICT aspects of the Thabina community; and a list of all the expertise to be found at Thabina. The Management Committee also looked into the matter regarding power lines for all the farmers.

An important aspect was that it was also noted by the meeting that there was a definite correlation between the agriculture-related information needs identified during the preceding Actions as well as the socio-economic needs and ICT needs identified. After lengthy participatory discussions on integrating the information and communication technologies identified to address the information needs identified in the preceding Actions with those identified to address the socio-economic needs and ICT needs identified, the meeting decided on the applicable information and communication technologies in order to address both these sets of needs. The meeting also made a most important conclusion: Apart from the socio-economic needs and ICT needs also identified with the interview schedule, the two sets of needs appeared to be alike and similar, which means that the same ICT could be used to address both sets of needs. The Management Committee decided that these ICT would comprise a telephone as well as a multifunctional printer – a computer would be purchased once it would be affordable. The Management Committee also came to the conclusion that the Internet, which would be unaffordable to them, would not be important in addressing any of these sets of needs.

The final decision to establish a telecentre was deducted from Question 32 to the end of the interview schedule, where the respondents indicated how far they must travel in order to access information and communication technologies and how high the costs thereof were. The Management Committee immediately instructed the researcher to obtain funds in order to establish the telecentre as the next Phase, Phase 3 of the four-phase participatory process.

After concluding on the results of the interview schedule (Appendix F) and explaining the identification of the information and communicate technologies that would address all the needs of the farmers of Thabina irrigate scheme, field notes on the various discussions are presented below.

6.4.3.1 Field-notes of Action 3: Discussions on the outcome of the interview schedule

- "It was important to note that there was a positive correlation between the needs as identified through the NPFA and the needs now expressed by the respondents in the interview schedule. This concluded and ascertained that the needs of the farmers of Thabina have not changed, they still had the same needs, problems and expectations as indicated and revealed during the preceding Actions undertaken in the Preparatory Phase, Phase 1. During the preceding Actions it was also revealed that the Internet, which now proved to be unaffordable, was not necessary to address the needs of the farmers of the Thabina irrigation scheme.
- "During structured interviews the socio-economic needs and ICT needs of the farmers (research participants) were identified. This is absolutely necessary, as without the knowledge of what these needs of the farmers are, the appropriate information and communication technologies could not be identified. The interview schedule used in this study should give clear guide lines for the drafting of an interview schedule on the socio-economic needs and ICT needs of a farming community in the developing world. The interview schedule (Appendix F) and the outcome thereof was discussed in a participatory manner with the Management Committee and presented an important picture of what such farmers would want to know about their community. Future researchers establishing telecentres should also note that it is good practice to draw sketches, as the sketches not only supported the questions, but with the determination of their meanings, a spontaneous, lively atmosphere was created. This helped to create a relaxed atmosphere while the farmers had to complete the interview schedules, which was a concept of the developed world, and totally new to them.
- "Findings of the structured interviews were discussed with the Management Committee in a participatory manner and they showed their appreciation for including them and the researcher should listen and understand the remarks and questions of the research participants. Together they compared the outcome regarding the information and communication technologies needs in the assessment of the NPFA and of the information and communication technologies pointed out by these structured interviews. The collation of information obtained from these two scenario's formed the basis of the decision on which information and communication technologies to buy. It was most revealing and enlightening to note the similarities of information and communication technologies needed for both these aspects. With the comparison of this information, it was clear that the farmers could firstly start off with the telephone which was already available, and to buy the multifunctional printer.

This suited all members of the Management Committee, as they did not have the funds at their disposal to buy a computer as yet at that stage. Future researchers involved in projects regarding the farmers at a small-scale irrigation scheme in South Africa must note that these farmers should be involved in the decision making process. This not only makes the actions of the researcher trustworthy, but also the information carried across. Future researchers should also note that only when the farmers are assured that their opinions were taken into consideration with the selection of the information and communication technologies, would they accept the information and communication technologies and be willing to learn how to use and operate it, as well as maintain it as their own.

- "There are a number of actions for me to undertake now, such as the compilation and distribution of a brochure and to look for funding to purchase the information and communicate technologies".

In this Section the discussion on the outcome of the interview schedule with the Management Committee, with special reference to responses to be clarified with the Management Committee was explained. The field-notes as documented by the researcher were explained to the Management Committee, who agreed with the decisions taken and suggestions made. All Actions of this Phase were approved by the Management Committee and could therefore be seen as successfully undertaken.

After the successful completion of the Phase, the various Actions of the Phase are formatively evaluated. The evaluations of this Phase are discussed and presented in the next Section.

6.4.4 FORMATIVE PM&E WITH RESULTS, CRITERIA AND RESEARCH METHODS OF THE VARIOUS ACTIONS UNDERTAKEN: Action 4

With the Actions of this phase successfully undertaken, these Actions are formatively evaluated by means of PM&E and the results of these Actions presented in Table 6.1 below.

Table 6.52: PM&E evaluations with results, criteria and research methods of Actions undertaken for Phase 2

ACTION NO	ACTION	PM&E EVALUATION WITH RESULTS	CRITERIA	RESEARCH METHODS
ACTION 1	**Draft documents** such as the Project Plan and how to manage a telecentre were **compiled** in collaboration with the Management Committee (analysing the emotional world) **(Oct. 2003 – Feb. 2004).**	1. Participant observation with field-notes during the participatory discussions showed that the relation between the researcher and the research participants was dynamic and reciprocal as new challenges such as the documents drafted by the researcher in English could be addressed with specific reference to the researcher explaining such First World concepts such as a Business Plan – noting all suggestions and questions in field-notes. The various aspects of the Business Plan were successfully identified and approved of, since the suggestions of the Management Committee were included. 2. Participant observation during feedback session which incorporated the field-notes taken during the first meeting of the final documents indicated that the Management Committee was satisfied with the finalization of the documents. 3. During the participatory discussions on 'How to manage a telecentre' with the secretary and the Vice-chairman, several suggestions and questions were asked and noted in field-notes which were incorporated in the final document, leading to the Management Committee to accept the document.**RESULTS:** 1. Discussing the drafted documents with the Management Committee were much appreciated by the Management Committee as they have never compiled such documents, which led to participatory discussions during which they accepted both	1. One of the key strengths of the PM&E method is seen to reside in exploring local knowledge and perceptions – researchers take part in research activities as participant observers. 2. A bottom-up approach: The researcher takes the needs and the wishes of the beneficiaries as the starting point.	1.Participatory discussions the Management Committee. 2.Participant observation with field-notes. 3. Feedback sessions

		documents: 2. The feedback session on the compilation of the Business Plan resulted in the approval of the document – the decisions taken could be implemented in the establishment of their telecentre. 3. Participatory discussion on 'How to manage a telecentre' resulted in the positive acceptance of the final document by the Management Committee. 4. Including the secretary in the discussions on 'How to manage a telecentre' led to another positive result: The secretary was pleased with the discussions on the document, because she knew she would be able to handle this aspect professionally and she noted also that "this is a job opportunity to look forward to". This led to all role-players being convinced that she would "do a good job".		
ACTION 2	During **structured interviews** the farmers' ICT and socio-economic needs were determined (analysing the emotional world) **(March 2004**	1. Participant observation with field-notes during the compilation of the interview schedule with the Management Committee and the Extension Officer clearly indicated that these role-players wished to ensure that the socio-economic and ICT needs would be those of the farmers of the Thabina irrigation scheme as such. 1. Participant observation during the field-notes taken with the determining the socio-economic and ICT needs (Appendix F) of the farmers showed that the farmers felt involved in as well as satisfied with the establishment of the telecentre which entailed positive feedback. 2. Participant observation during the completion of the interview schedules showed that to make use of interpreters was also a good thought, as it resulted in ensuring that the research participants understood all the questions in the interview schedule. 3. Since the total target population (84) has categorically decided	1. Concern over understanding: During the completion of interview schedule the researcher ensured that the research participants understand and comprehend the questions. 2. By involving local, indigenous peoples as research participants in the research in such a bottom-up approach will entail that the researcher takes the needs and the wishes of the beneficiaries as the starting	1.Structured interviews. 2.Interview schedule to determine socio-economic and ICT needs with a stratified sample of 97 farmers. 3. Statistical analysis: **Sample size = Z^2 x StdDev x (1 – StdDev)/$(ME)^2$** From a departure point a StdDev of 10% was supposed as well as a Confidence Level of 95%. 4. Participant observation with field-notes.

		that they do need a telecentre at their irrigation scheme, the Standard Deviation was eventually a zero 10%. **RESULTS:** 1. Due to the participatory discussions with the Management committee in order to ensure that the socio-economic and ICT needs to be identified will be those of the farmers of the Thabina irrigation scheme, resulted that a 100% attendance was received, which meant that authentic results could be obtained on which ICT should be bought. 2. The use of local interpreters resulted in the effective completion of the interview schedule which means that the outcome of the interview schedule could be seen as authentic and valid. 3. The minimum sample size of 48 farmers (Chapter 4, Section 4.2.7) was exceeded because the eventual sample size was 84 farmers, which produced a higher assurance than expected.	point, rather than to enforce his/her own ideas and interests.	5. Feedback sessions
ACTION 3	Participatory discussions regarding the **findings** of the interview schedule and **(April 2004).**	1. Participant observations during discussions indicated that the Management Committee agreed that the findings of the interview schedule proved to be the socio-economic and ICT needs of the farmers of the Thabina irrigation scheme as such. This was because the questions relevant to the socio-economic and ICT needs of the farmers of the Thabina irrigation scheme, were prepared by them and the Extension Officer during the compilation of the interview schedule. 2. Participant observation during the discussions showed that the Management Committee was satisfied with the outcome and findings of the interview-schedule – not only because the farmers had the opportunity to voice their opinions and asked questions and made	1. One of the key strengths of the PM&E method is seen to reside in exploring local knowledge and perceptions. 2. Information is periodically analysed and discussed during feedback sessions in order to analyse, add up, discuss, integrate information. This led to agreement on the objectives and activities.	1.Participatory discussions with the Management Committee. 2.Participant observation with field-notes. 3. Feedback sessions

		suggestion, but also because a 100% farmers attended, which indicated that the farmers were eager to take part in the establishment of their telecentre. 3. Participant observation showed that the outcome was successfully discussed and their questions and uncertainties were noted as field notes as part of Appendix F – the Management Committee was satisfied that the outcome presented was a good indication of the needs of the Thabina farmers. **RESULTS:** 1. The Management Committee was satisfied with the outcome of the interview schedule as explained to them in, because they seen the outcome as valid and authentic, as all the questions were answered in a satisfactory manner by the interpreters – the research participants understood all the quests and could provide true and valid answers. 2. The findings proved to be the socio-economic and ICT needs of the farmers of the Thabina irrigation scheme as such, as proposed by the Management Committee and the Extension Officer during the compilation of the interview schedule. 3. This outcome also led to the compilation and distribution of a brochure which entailed not only the agriculture-related activities but also the various socio-economic and ICT activities that are undertaken as well as expertise of the Thabina community. 4. The outcome of the discussions of the interview schedule on agriculture-related needs resulted to the following immediate arrangements: The researcher subscribed to the *NuFarmer* and the *DAFFNews* (mouthpiece of the DAFF) for free of charge and for health care issues, lectures regarding HIV/aids, child nutrition and healthcare aspects were arranged with and presented by the clinic		

		and all children were vaccinated the following week.		
	Identifying ICT (simplify physical world) **(Oct. 2004)**.	1. During participatory discussions regarding the ICT, participatory observation indicated that the Management Committee was interested in the usage and operation of ICT at their telecentre. Field-notes revealed that the Management Committee had questions about the ICT regarding to whom it will belong as well as the usage and functioning of the ICT. 2. During participatory discussions of these field-notes during feedback sessions with the Management Committee, these uncertainties were addressed. **RESULTS:** 1. The Management Committee was satisfied the ICT should belong to them as such, and not to the LDA or the ARC. This led to a further affirming of the Management Committee that the ICT should be bought. 2. During the feedback session the discussions regarding the ICT resulted in a positive outcome, as the Management Committee decided that the information and communication technologies should be bought in order to enable the farmers to communicate, enabling them to address their information needs. This led to the Management Committee immediately requesting the researcher to purchase the ICT without any further due. 3. During the feedback session, the constructive outcome of the interview schedule led to the positive identification of ICT that could address the socio-economic and ICT needs as well as the agriculture-related information needs of the farmers of the Thabina irrigation scheme. 4. The findings of the farming needs proved to be the same as during the examination of the NPFA. This resulted in the fact that no	1.To involve local, indigenous peoples as research participants in the research process 2. The researcher should make it clear that the intervention does not belong to the researcher but that the intervention belongs to the community. 3. As participant observer the researcher took part in research activities.	1.Participatory discussions with the Management Committee. 2.Participatory observation with field-notes. 3. Feedback sessions

		additional ICT had to be bought – the same ICT needed to address the NPFA, could be used to address the current needs of the farmers. 5. The researcher immediately began to look for sponsors and within a month the first ICT was bought.		
ACTION 4	**Formative PM&Evaluation (formative) (May 2004).**	1. Participatory observation during the formative evaluation at the end of the Phase indicated that the Management Committee was satisfied with the outcome of these preparatory actions undertaken. This was due to the fact that these Actions were undertaken in a participatory manner where farmers could voice their concerns and ask questions. 2.The field-notes taken through-out the Actions as well as the discussions during the feedback sessions undertaken, were merged in the formative evaluations. **RESULTS:** 1**.** Merging the formative evaluations of the feedback sessions of the Actions resulted in the Management Committee appreciating that all their concerns and questions were addressed successfully and the Phase was executed satisfactory and thoroughly. 3. The positive reactions of the Management Committee where no special or additional queries of difficulties were noted in field-notes resulted Management Committee agreeing that the project could progress to the following Phase.	The formative evaluation after completion of phase should be discussed and verified with the Management Committee.	1.Participatory discussions. 2.Participatory observation with field-notes. 3. Feedback sessions with the Management Committee.

This Section discussed the Participatory Evaluation and Monitoring results. In the next Section a summary of this phase will be presented.

6.5 SUMMARY

This chapter focussed on the introduction of unfamiliar challenges to the small-scale farmer by means of the compilation of three documents and determining the socio-economic and ICT needs of the farmers and the opinions and analysis of the farmers regarding the applicable ICT to address their needs.

Section 6.1 presented an Introduction to the Chapter. Section 6.2 presents background on how Phase 2 proceeded; Section 6.3 explained the various actions for Phase 2 and evaluation thereof; Section 6.4 gave a brief overview of what could be expected from this Chapter: the various Actions to be undertaken in the Preparatory Phase of the four-phase participatory process. Section 6.4.1 described the general procedure of the collation of the documents, with Section 6.4.1.1 a discussion of how to compile documents including Section 6.4.1.2 with the explanation on the various matters of the Project Plan and suggestions and remarks by the Management Committee and Section 6.4.1.3 with the discussion on the seven features of the document on 'How to manage a telecentre'. Section 6.4.2 described how the socio-economic and ICT needs were identified: Section 6.4.2.1 discussed the interview schedule; Section 6.4.2.2 regarding the completion of the interview schedule: Section 6.4.2.2.1 regarding the process during the structured interview; Section 6.4.2.2.2 explaining the process for completing the interview schedule; Section 6.4.2.2.3 explained the flip charts; Section 6.4.2.2.4 presented a discussion on the field-notes taken; 6.4.2.2.5 presented the participatory discussion regarding the interview schedule and Section 6.4.2.2.6 explained the field-notes taken during the process. Section 6.4.3 explained the participatory discussions regarding the interview schedule and identifying of the ICT. Section 6.4.4 evaluated the success of the Phase by means of Participatory Monitoring and Evaluation with results, criteria and research methods. Section 6.5 presents a summary of this chapter.

This Chapter explained and evaluated the Preparatory Actions that were undertaken before the actual establishment of the telecentre could commence: The managerial documents were successfully compiled in close collaboration with the Management Committee and the socio-economic and ICT needs were identified with a sample size which was determined statistically in accordance with Chapter 4, Section 4.2.7 from (Bury, 1975). The minimum sample size of 59 farmers (Chapter 4, Section 4.7) was exceeded because the eventual sample size was 84 farmers, which produced a higher assurance than expected.

The ICT needs and the socioeconomic needs identified by means of this interview schedule were integrated with the agriculture-related information needs identified in the preceding Actions of the previous Phase, Phase 1. A most important and fundamental outcome was

that the information and communication technologies identified to address each of these sets of needs, proved to be comparable and similar.

This simplified the task of the Management Committee and the researcher regarding the identification of appropriate information and communication technologies to be bought in order to address all the needs of the Thabina farmers. This part of the study will be undertaken in the next Chapter, Phase 3 – the actual Establishment Phase. This discussion will also explain and evaluate the installation of the information and communication technologies, the training in the use there-of and what the trainees could accomplish with their new expertise.

CHAPTER 7 – ESTABLISHMENT PHASE: THE ESTABLISHMENT OF THE TELECENTRE

7.1 INTRODUCTION

The previous Chapter explained the Actions to be undertaken before the actual implementation of the telecentre could commence. These were documents compiled for the establishment of the Thabina telecentre as well as identifying the ICT needs and the socio-economic and ICT needs of the Thabina community. An important aspect to note was that in comparing the information and communication technologies to address these socio-economic and ICT needs with the information and communication technologies which could address the agriculture-related information needs identified during the preceding actions of the study, it was found that these two sets of information and communication technologies seemed to correspond and to be comparable. With all pre-establishment Actions undertaken successfully, as evaluated by its formative PM&E, the actual establishment of the telecentre could commence.

This Chapter describes and explains the various Actions undertaken during the actual establishment of the telecentre and forms Phase 3 of the four-phase participatory process. During this Phase the Management Committee and the researcher decided by means of participatory discussions regarding which information and communication technologies should be bought and installed, as well as who should be trained in the usage thereof and the researcher undertook the training of the trainees as such. Decisions were made regarding the identification of appropriate information and communication technologies bought in order to address all the needs of the Thabina farmers. The information and communication technologies bought, addressed the agriculture-related information needs of Thabina as well as the surrounding farmers and also the socio-economic and ICT needs of not only the Thabina community, but also the surrounding communities, which include the surrounding schools and technikons.

Phase 3 also explains and evaluates the installation of the information and communication technologies, the training presented in the use there-of and the most critical aspect of the Thabina irrigation scheme identified by means of the computerisation of the management system and the financial system, namely the financial situation of the irrigation scheme.

This led to the central theme of this Chapter being a description of the actual implementation of the telecentre, or information centre, as the Chairman of the Management Committee has previously referred to such a centre – even before the commencement of the project as

such. This chapter forms Phase 3 of the four-phase participatory process as described in Chapter 4.

Section 7.1 presents an Introduction to the Chapter, Phase 3. Section 7.2 portrays the background on how Phase 3 proceeded with Section 7.3 discussing the various Actions for Phase 3 and evaluation thereof. Section 7.4 offers those Actions taken towards the establishment of a telecentre. Section 7.4.1 describes the actual implementation of the telecentre with Section 7.4.1.1 the installation of the multifunctional printer (MFC-9180), with Section 7.4.1.2 on the field-notes and 7.4.1.3 the participatory discussions on the field-notes. Section 7.4.1.4 describes the purchasing and installation of the computer with Section 7.4.5.1 on the field-notes taken and Section 7.4.1.6 the participatory discussions on the field-notes. Section 7.4.2 describes Action 2, the training of the role-players with Section 7.4.2.1 explaining the training material and Section 7.4.2.2 other important aspects which were also addressed during these workshops which included a library in the telecentre and field-notes on the implementation of the information and communication technologies. Section 7.5 explains which aspects dealt with could be seen as good practice. Section 7.6 evaluates the Phase according to PM&E with results, criteria and research methods. Section 7.7 presents the summary of the chapter.

Before this Chapter on the Actions and the evaluation of the Pre-establishment Phase can commence, it is necessary to present a background of how this Phase proceeded, developed and evolved. These aspects, such as the background on how the Phase 3 proceeded, are briefly explained in the next Section.

7.2 BACKGROUND ON HOW PHASE 3 PROCEEDED

The following is a short overview of how Phase 3 proceeded and progressed: With the identification of the information and communication technologies which could address the agriculture-related information needs as well as the socio-economic and ICT needs identified in the previous Chapters, these information and communication technologies could be purchased and installed. Training was presented to the role-players identified to operate the information and communication technologies. The success of these Actions could be evaluated in order to ascertain whether Phase 3 had executed successfully.

The next Section presents these Actions to be undertaken in a time-line format in figure 5 with a brief discussion of these Actions, in order to comprehend when, how and by whom these Actions were undertaken.

7.3 TIME-LINE FOR THE ACTIONS OF THE ESTABLISHMENT PHASE AND EVALUATION THEREOF

With the various Actions for this Phase explained in the previous Section, these Actions are now presented in a time-line as to when they were undertaken. This Section will present the time-line and a brief explanation of the Actions undertaken.

Figure 7.1. Phase 3: Implementation of the telecentre

PHASE 3 Implementation of the telecentre:
May 2004 - Dec 2005

In this phase the following actions were taken:

Action 1: The appropriate ICT was bought and installed by the vendor (ease of physical world) **(May - Aug. 2004).**

Acion 2: The secretary of the telecentre as well as the Vice-President of the Management Committee were trained (ease emotional world) **(Sept. 2004 - Nov.2005).**

Action 3: Formative PM&Evaluations – iterative and formative **(Dec. 2005).**

Data collection methods : Feedback sessions, training sessions and participatory observations with field-notes

Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

Phase 3: Implementation of the telecentre.

Action 1: Ease of physical world: In the previous Phase, Phase 2, the information and communication technologies to address the agriculture-related information needs as well as the socio-economic and ICT needs of the research participants were identified by the Management Committee in collaboration with the researcher. In this Action the appropriate information and communication technologies were selected by the Management Committee as such, and bought, in collaboration with and with the support of the researcher, so that nothing was undertaken without the consent of the research participants.

Action 2: Ease of emotional world: Training was given to the secretary as well as the Vice-President of the Management Committee, especially for new users. This training resulted in the secretary gaining the expertise which led to her not only identifying the crucial financial situation of the Thabina irrigation scheme, but also typing various managerial documents including the Agendas and Minutes of the meetings of the Management Committee.

Action 3: PM&E was undertaken in this cross-cultural dialogue, as the farmers were understood from their own frame of reference. Feedback sessions, training sessions and participatory observations with field-notes were used to collect data.

With this Section presenting a time-line of the Actions, as well as a brief discussion on what these Actions involved, Actions towards the actual implementation of the telecentre at the Thabina irrigation scheme commenced. But first of all decisions on which information and communication technologies should be purchased, were made: In the next Section the decision making process of selecting the applicable information and communication technologies to be bought, purchasing and installing of the information and communication technologies, as well as the training in the usage thereof, are discussed.

7.4 ACTIONS UNDERTAKEN IN PHASE 3

The following Sections present the systematic progressing of the establishment of the agricultural telecentre at the Thabina irrigation scheme. This establishment of the Thabina telecentre evolved around the purchase and installation of as well as the training presented and expertise gained from the information and communication technologies. The most crucial aspect as identified in the previous Phase, Phase 2, was that the information and communication technologies that could address both the agriculture-related information needs as identified in the preceding Actions (Phase 1), and those identified in Phase 2 with the socio-economic and ICT needs, corresponded and were similar. .

Consequently these establishment Actions entailed the purchase of these information and communication technologies and the actual installation thereof in the telecentre. This will be followed by an explanation of the important aspect of training in the usage of the information and communication technologies which led to the important aspect of exposing of the financial dilemma of the Thabina irrigation scheme.

With the brief explanation on the evolving of Phase 3 of the four-phase participatory process, the first Action undertaken is described: The next Section explains and describes how the information and communication technologies were implemented in the telecentre

7.4.1 IMPLEMENTATION OF THE INFORMATION AND COMMUNICATION TECHNOLOGIES: Action 1

This Section comprises the actual implementation of the information and communication technologies, which comprised the identification, the purchasing and the installation of the information and communication technologies.

During a participatory discussion held with the Management Committee on 4 June 2004 in order to determine which information and communication technologies should be bought firstly, the Vice-Chairman of the Management Committee reminded the meeting that the previous surveys had indicated which information and communication technologies should be bought: The findings and conclusions of the determination of the agriculture-related information needs, each with its recommended ICT (Chapter 5, Section 5.5) as well as the structured interviews on socio-economic and ICT (Chapter 6, Section 6.6) needs was agreed upon and approved of by the Management Committee during participatory discussions. These discussions came to the conclusion that the farmers needed, *inter alia,* agriculture-related information which could be obtained from the computer, fax, printer, copier and telephone, and if afforded, Internet and e-mail as well as that the farmers also needed to communicate via the information and communication technologies with other agriculture-related organisations. The socio-economic and ICT needs could also be addressed by, apart

from lectures and the library as such, the same information and communication technologies identified to address the agriculture-related information needs.

A bottom-up approach was followed with the decision on applicable information and communication technologies that would address the information needs of the research participants: After participatory discussions on the findings of the identification of agriculture-related needs and the structured interviews indicating the socio-economic needs and ICT needs with the Management Committee, the meeting decided that the minimum requirements of the telecentre were a computer and a multifunctional printer. After many participatory discussions with field-notes regarding which information and communication technology could be afforded firstly, it was decided to purchase the multifunctional printer first.

The researcher was then mandated to find donors in order to be able to purchase the information and communication technologies. The Management Committee decided that the information and communication technologies would be bought on a 50-50 basis, in order to encourage the sense of ownership of the information and communication technologies, which did not materialise, as the Management Committee realised that they did not have the funds. The researcher contacted various organisations for donations and a contribution of R5 000 was received from a company in the United Kingdom, which was enough according to a quotation for a multifunctional printer from a company in Tzaneen. The computer would be bought at a later stage when more funds had been obtained.

This Section explained the procedures of deciding which of the information and communication technologies should be bought, as well as from whom, when and who should provide the funds. With these decisions in mind, a multifunctional printer was bought from a vendor in Tzaneen, the nearest town to the Thabina community. The next Section describes how the multifunctional printer was installed.

7.4.1.1 Installation of the multifunctional printer

A workshop at the Thabina telecentre was held on 31 July 2004. The aim of the workshop was to install the multifunctional printer and to establish a small library of publications. The workshop lasted four hours.

The Chairman, Vice-Chairman, the secretary, personnel from the Tzaneen-based company which supplied the information and communication technologies and the researcher attended the workshop. In Box 7.1 below, their arrival is described.

The technology consisted of the multifunctional printer which was bought in Tzaneen.

The head of the Printing Section of the Institute for Agricultural Engineering (ARC-IAE) and the researcher left at 04:30 for Tzaneen and met with the staff of the company, from which the multifunctional printer was bought, at their office in Tzaneen. The owner of the company and his son who would do the installation, the head of the printing section and the researcher left for Thabina, where they arrived at 10:00. The Chairman and four members of the Management Committee, as well as the secretary, awaited them in great expectation. They were warmly welcomed by the Chairman of the Management Committee.

Box 7.1. The arrival of the company in order to install the multifunctional printer

Source: Researcher's participatory observations and field-notes

7.4.1.1.2 The workshop held for the installation

The multifunctional printer unit was installed by an official of the vendor, on a table in the telecentre and he demonstrated its functions – it worked perfectly. Unfortunately, there was no telephone line in this office at the time, as the telecentre had recently moved to a larger office, but the functions of the fax were explained.

The Management Committee had already made arrangements to install a telephone line in this new office. The Management Committee were surprised about the size of the technology, because "we think it would be so much bigger". This just showed again how important a demonstration of the information and communication technologies is. The multifunctional printer was in good working condition and operated perfectly. Everyone showed their appreciation for the explaining of the operation of this device. The head of the printing section at the ARC made a huge contribution giving advice on the paper, copying and faxing aspects, such as the handling of the paper (the weather in Tzaneen is very humid etc.).

During the feedback session on the purchase of the multifunctional printer, the researcher explained why the multifunctional printer had been chosen – the advantages of the laser jet over an ink jet copier were emphasised. She also explained the advantages of the flat bed "where books could be copied".

A quotation for the computer (as requested by the researcher from the same company as where the multifunctional printer was purchased) – to be connected to the multifunctional printer for printing and scanning purposes – was handed to the Chairman. There were many questions about the operation of the scanner in particular, but the researcher made it clear that once a computer was installed, the operation of the scanner and the printing via the computer would be explained.

7.4.1.2 Field-notes on Action 1 – purchase and installation of the multifunctional printer

"Management Committee was concerned regarding to whom these information and communication technologies would belong, seeing that the donor bank provided the funds, but during the feedback session the researcher explained to the Management Committee, by means of participatory discussions, that these information and communication technologies would belong to the telecentre of the WUA. By means of observation I saw that the Management Committee was satisfied that the information and communication technologies do not belong to the researcher, the ARC or the vendor.

"All information and communication technologies will have to be bought with donor funds and not on a 50-50 basis as previously decided.

"The multifunctional printer was installed correctly and was fully functioning – the advantages of the laser jet were demonstrated".

7.4.1.3 Participatory discussion on the field-notes

During the participatory feedback session on discussing the field-notes, the Management Committee was satisfied that the information and communication technologies belong to the WUA as such. This then also meant that regardless of which farmers would form the Management Committee, the information and communication technologies will always remain in the telecentre as such.

After the successful purchase and installation of the multifunctional printer unit, the researcher embarked on finding donations for the purchase of a computer for the Thabina telecentre, as it was decided and explained by the Management Committee that the WUA did not have enough funds to buy a computer. The purchasing and the installation of the computer will be discussed in the next Section.

7.4.1.4 Purchasing and installation of the computer

The computer with software was bought from the same company in Tzaneen and installed by the company in the telecentre. The costs were R10 400. A donation of R10 000 for the telecentre was received from a local bank. R5 000 would be used for the computer with the other R5 500 paid by the WUA. The researcher discussed the situation with the Management Committee during a meeting especially because the "WUA do not have the R5 500 to pay for our share (half) of the computer". The researcher contacted the donor bank which agreed that the entire R10 000 could be used to buy a computer. The Management Committee decided that they would obtain Internet facilities only once they had enough money. The computer was installed by the IT Division of the LDAFF.

How to disconnect the information and communication technologies during the evening was also explained. This worked very well as the farmers are used to heavy thunderstorms in

their area and realized the damage it could do to the information and communication technologies.

7.4.1.5 Field-notes on Action1 – the purchase and installation of the computer

"The Management Committee decided on the software package with MSWord "to type our documents of our meetings" and MSExcel to "type our documents for our finances.

"The Management Committee had decided beforehand to "buy the information and communication technologies from a company in Tzaneen, because they were close to us", should any maintenance be necessary".

"Explanations during the demonstration of the technologies in Phase 1, were again discussed, and the Management Committee agreed with me to purchase the MSWord and MSExcel programmes".

7.4.1.6 Participatory discussions on the field-notes

During the feedback session, the field-notes were discussed in a participatory manner. The various programmes of the computer (MSWord and MSExcel), were discussed and explained again to the Management Committee as these were new concepts to them, which only the Chairman of the Management Committee understood, as he owned a computer. The researcher explained to the Management Committee that the training material to be used for the training of the trainees in the operation of the computer, included the explanation and exercises of the application of these programs.

The Management Committee approved of the vendor in Tzaneen, as it was the closest to Thabina, should any maintenance problems occur. Overall it could be said that the Management Committee was pleased and satisfied with the information and communication technologies bought, as it would also ensure that their calculations for the submissions to the DWA would be accurate. They thanked the researcher sincerely and deeply for her inputs in the purchasing and installation of the information and communication technologies.

This Section clarified why, how and from whom the information and communication technologies were bought and installed. With the information and communication technologies installed in the telecentre, the next step was to train the role-players in the operation of these information and communication technologies. The next Section explains the training material and the training in the usage of the information and communication technologies.

7.4.2 TRAINING OF ROLE-PLAYERS: Action 2

With the information and communication technologies installed, the training in the operation thereof could commence. The training had to be executed with empathy and understanding as the information and communication technologies, and therefore the operation thereof, was a totally new concept to the trainees. This training was conducted by the researcher and those trained were the secretary of the telecentre and the Vice-Chairman of the Management Committee of the Thabina WUA. The courses lasted on specified days from Sept. 2004 – Nov 2005, from early in the mornings till early noon. This process was time-consuming, as the information and communicating technologies was a new concept to them. On completion of the courses, they both received a certificate. It should be noted that this training is also in compliance with the Presidential Initiatives of 'Job Creation'; 'Skills Training'; and 'Human Resource Development'.

Technology transfer by means of training involved the transfer of new technology from its agricultural researchers to its clients. With the purchase and the installation of the information and communication technologies, future technology transfer was seen to become a useful and valuable core function of this telecentre, especially among these resource-poor irrigation farmers at Thabina. The training material used to train the trainees will be discussed in the next Section.

In the next Section the training material used to train the trainees are discussed and explained.

7.4.2.1 Training material that was used

The courses in computer literacy were developed by a company in Stellenbosch and the following manuals were used for training:

- ***Know your keyboard: a typing manual for beginners***
- ***Introduction to computer literacy***

  This introductory course was discussed in detail.
- ***Introduction to Windows***

  This introductory course was explained on the basis of the documents included, which also comprised exercises and tests.
- ***Introduction to word processing: MSWord***

  This was experienced as the most interesting of all the courses, as it included practical exercises. The exercises with the alignment, copy, format and format changes, and all features on the menu bar, as well as the standard and the

formatting toolbars were explained and the trainees found them most informative and stimulating.

- ***Introduction to spreadsheets: MSExcel***

  This was the most valuable exercise and the whole concept of a spreadsheet had to be explained in detail since this software would be utilised for the WUA's bookkeeping system.

  This manual was discussed, and the exercises were found to be easy. It was suggested that these exercises should be repeated as often as possible.

- ***Introduction to e-mail and Internet; Outlook Express; Internet Explorer***

  This manual was discussed briefly, as the Management Committee decided to postpone the acquisition of this software and made provision for this item in their budget. The discussion was, however, found to be most interesting and both trainees confirmed that information obtained from the Internet would address many of the farmers' information needs as well as those of the community. It should also be noted that there were some farmers who visited the library in order to obtain information on various vegetables diseases, and the Vice-Chairman of the Management Committee mentioned that this information could have been obtained over the Internet had it been installed.

- Although no manual was available, a hands-on course in PowerPoint was also given. While the scanner had not yet been connected to the computer, ClipArt pictures could be inserted into presentations from MSWord.

These courses sometimes lasted for a whole day and sometimes only during the mornings, depending on the material to be covered and learnt. During these training sessions all details were explained and demonstrated and the trainees familiarised themselves with the basic concepts. Evaluation of competence in each model was done by means of completing the test provided at the end of each model. Both trainees passed these tests.

7.4.2.2 Other important issues addressed during these workshops:

Although these workshops were initially undertaken for the purpose of training the trainees appointed by the Management Committee – the secretary and the Vice-Chairman – in using the computer, many other urgent problems were also addressed, which are discussed below:

- **The WUA Bookkeeping system**

Up to that point, the books of the WUA had been kept manually, which was time-consuming and not always accurate. By computerising the bookkeeping system, a great deal of time could be saved and information would be more readily available as it would be easy to produce up-to-date financial statements for each farmer, as well as to summarise relevant management information for the WUA.

In particular, time was spent on developing the formulas for the accounts of each of the farmers. The following fields used in the accounts system for the farmers:

- previous payments
- arrears
- total due

The WUA would be obliged to submit several calculations regarding water use, water measures, etc. to the DWA, as to adhere to various rules and regulations stipulated in the National Water Act (Act 1998) (NWA). Therefore a Senior Official from the DWA was requested to assist in the preparation and formulation to computerise the financial system, in order to adhere to the requirements of the DWA. The researcher assisted the secretary in computerising the entire bookkeeping system according to these rules – and organising each ward into a separate file, consisting of an average of 54 farmers per ward. These files were then populated with data and then processed from November 2004 to November 2005. This presented computerised financial, business and technical systems. The various aspects were explained and demonstrated by the researcher to the secretary and the Vice-Chairman. After these extensive training sessions, both of the trainees were capable of independently following the logical sequence of spreadsheet calculations, correcting errors in the programming and changing the format and appearance of the document where necessary.

In order to address the farmers' information needs, as expressed during the surveys, the following was given special attention: one of the requests made by most of the farmers was that each month they would like to obtain: "How much have I paid till now?" "What is my premium for the current month?" and "How much do I owe now?" In view of these needs, formulas were developed for the monthly calculation of the following fields for each of the 215 farmers:

- Total previous payments
- Arrears
- Total due
- This month's payment

An example of these fields populated is presented in Appendix H, which presents an example of an account of one of the farmers.

These calculations were done for the data until the end of the year 2005. During this time, both the trainees were trained on how to update the bookkeeping system for the coming year. Other information the Management Committee could obtain was the following:

- **Financial,** such as total monthly income, total monthly arrears, and extent of arrears for each farmer; the WUA payment of the annual Catchment Management Charge to Department of Water Affairs.
- **Business,** such as income and expenditure; the WUAs' Water Management Plan, to be reported annually to the DWA; and correspondence regarding elections and representation of the indigenous groups.
- **Technical**, such as the water audit on how much water was received/month; what the shortages and spillages at the weir are; day-to-day management information such as the amount of water used daily/weekly per farmer and financial information regarding payment of water accounts. The measurement of the water is calculated in the following way: The amount of water received by every farmer is measured through a calibrated sluice gate. By measuring the time the water flows through the sluice gate, the amount of water can be calculated by means of the information and communication technologies. These two figures, i.e. the flow rate and the time are multiplied. The answer is cubic metres. A Senior Official from DWA explained and demonstrated this procedure to the Chairman and the Vice-Chairman of the Management Committee as well as to the secretary.
- **Maintenance programme,** such as cost per month; and comparison to budget.
- **Construction,** such as networks, and cost determination for new budgets.
- **Human resources,** such as personnel structure, and salaries and bonuses vs. the budget.
- Once they had **Internet facilities**, they would be able to obtain information on their farming practices, including market trends, daily fresh produce prices at the market, farming practices, daily weather information for irrigation scheduling, as well as information on tele-medicine, job hunting, tele-schooling, etc.

It should also be noted that it was quite easy to teach the secretary to type, as she had previously done a typing course as a learner. The Management Committee noted this as well, and commented that she was a "good choice". However, the Vice-Chairman and the secretary, the trainees, would have to practice the software packages, as well as the use of the keyboard.

- **Letters to the farmers**

The secretary typed various documents of the Management Committee on the Thabina Telecentre letterheads and saved them as separate files on the hard drive of the PC, as well as on "stiffies".

- **Lists of names** of the various groups in the different Wards were compiled in table format:
- **Existing information sheets** on tariffs, etc. and office notices to the farmers were also typed by the secretary and printed in landscape format, to be pinned to the notice board**.**
- **Word processing exercises** in MS Word were done and saved on stiffies for the trainees to practice later.
- **Spreadsheet exercises** in MS Excel were created and saved onto stiffies for the trainees to practice later.
- **Marketing:** The first step was taken with the participatory process of billboards to indicate the road to the telecentre. The researcher contacted the Limpopo Provincial Road Agency (LPRA) and the Vice-Chairman completed the standard form presented by them. This was faxed through to the Department and the telecentre is still awaiting their consent to erect these billboards.

The researcher and the Management Committee decided to compile a brochure on the Thabina WUA (Appendix I). This brochure would entail firstly the various services offered by the telecentre, with a brief description of the prices for the usage of the information and communication technologies. Other information that was included in the brochure was regarding activities such as the social activities, information regarding the cultural aspects of Thabina, what the farmers were selling (farming aspects as well as cultural aspects), what the Thabina community was selling as well as their activities (doing), as indicated in Question 20 of the interview schedule in Chapter 6 in Sub-section 6.4.2.2.5. The researcher compiled a brochure and discussed its content with the Management Committee during a meeting. She then compiled a draft and faxed it through to the Management Committee, who approved it. It was photocopied by ARC-IAE, her employer. On the next visit, she gave the brochures to the secretary so that they could be distributed to schools, the surrounding training colleges and Cooperatives in the nearby towns and villages.

- **Ordering vegetable seed** from Hygrotech for the farmers by the WUA (Appendix J)**:** For the first time since the establishment of the Thabina irrigation zcheme, seed was ordered through the telecentre by means of typed orders, which meant that no errors on the various items as well as prices could occur, as had happened occasionally in the

past. The manager of the Cooperative felt that the typed order was much more reliable and more convenient than placing the orders by phone.

- **Curtains for the two windows of the telecentre office:** Material for curtains was also bought by ARC-IAE. The curtains were made by a local woman that same evening on her sewing machine and were put up the next morning.
- **Logo for the letterhead and advertising material:** The logo for the telecentre (Appendix K) was decided on by three delegates nominated by the Management Committee. Finally, it was decided that the logo would consist of a computer monitor with a basket of vegetables, symbolising the vegetables cultivated by means of the tool of communication, the computer. In future, this logo would feature on the sign at the entrance to the telecentre, as well as on the letterhead of all Management documents, such as receipts and accounts, and on all advertising material.
- **Painting of the telecentre building and erecting modern ablution facilities:** The researcher arranged with the Director of the Limpopo Department of Land, Agriculture and Environment, to have the building painted as well as to build flush toilets and a shower. An Official from the National Department of Agriculture, Limpopo Province, visited Thabina on the following Tuesday, 13 August 2004, to attend to the matter.
- **Integrating the local, oral communication system with information and communication technologies:** Another use of the telecentre that has emerged since its establishment was the specific manner in which the telephone was used by the farming community. Each day, members of the surrounding communities gathered under the trees adjacent to the telecentre to wait for their turn to make or receive telephone calls. Calling a specific person out there to the telephone became quite a problem for the telecentre secretary. She had to leave her desk to call the person from the door, and the message could often not be heard by the person who was being called. The researcher suggested a public address (PA) system to solve this problem. A suitable and affordable system was subsequently selected by the secretary at a local dealer, the financial approval was obtained from ARC-IAE and the PA system was bought and installed. This telephone played a pivotal role in the survival of the telecentre and the farmers as such.
- **Lectures** for the women on health issues were arranged by the secretary to be presented by the Department of Health during the following week. Many additional lectures were also arranged. All the children of the community and surrounding communities were vaccinated.

In this Section the actual implementation of the information and communication technologies was explained, with inclusion of the various training sessions and the various valuable

outcomes of these information and communication technologies for the farmers. With the establishment of the telecentre, numerous other aspects were addressed, as explained in this Section. In the next Section, another medium that the telecentre offered in order to obtain information is discussed – a library. The implementation of the library at the telecentre is explained in the next Section.

- **Establishment of the library**

The small library, which was also installed in the telecentre, functioned very well. Fifteen Infotoons with 38 agriculture-related topics from the Agricultural Research Council, as well as 48 booklets and 71 leaflets from the Directorate of Communication of the National Department of Agriculture, were placed in the library**.** The titles of the booklets and leaflets can be seen in Appendix L. The leaflets also contained information on how to form a Cooperative, HIV/Aids and the farming community and how to run a meeting**.** The library is popular among the farmers as they visit it frequently. Therefore the researcher also arranged that they would receive the *DAFFNews* (mouthpiece of the Department of Agriculture) and the *NuFarmer*, a newspaper aimed at the small-scale farmer, free of charge. Both are monthly newspapers.

During the feedback session with the Management Committee, they expressed their satisfaction with the telecentre: “The secretary can now calculate our monthly income”; “every month the farmers want to know how much they owe”; “the teachers of the school also use the machines”; “the project plan helped us to establish the telecentre correctly”; “The library help us to get information on our crops”. From these discussions and through participant observation it was clear that they were pleased with the idea that they had bought new information and communication technologies instead of secondhand ones: “old machines will break”; “we don’t have the money to fix machines”. The gratitude that the researcher received from the Management Committee regarding this new intervention also showed their appreciation.

The surrounding communities also used the telecentre: There were a few who brought “private letters to be typed and printed”. Some also wanted to send faxes and some private faxes were received. It was clear that the telecentre would assist the Thabina community in their social and economic development. Learners also used the computer by asking the secretary to type their documents such as school assignments, assignments for the nearby College, CVs, etc. The Technikon used to compile their In-house Journal and the school teachers used the copier to duplicate their lesson material.

The telecentre was now implemented, the information and communication technologies were installed, and training had been given in the operation of the information and

communication technologies. The Management Committee felt that the Internet service should be initiated at a later stage when more funds were available.

The next step was to discuss the field-notes taken through-out the Phase with the Management Committee.

7.4.2.1.6 Field-notes on the establishment of the telecentre as discussed with the Management Committee

The following field-notes made by the researcher were discussed with the Management Committee during the feedback session:

- "Both trainees are excited about their training and they did their best to learn every detail. Many remarks, questions and suggestions were made during the training: "I want to learn everything from the machines", was the general remark. No technophobia was present, because as soon as one aspect was explained, they were eager to try it themselves: "Let me try, let me try!" – it was surely a pleasure to teach them how to operate the computer. It seems as if this arrangement of teaching a developing people in a participatory, emphatic manner how to use first-world appliances such as the information and communication technologies was a good one.
- "The many visitors to the telecentre are impressed by how effectively these information and communication technologies could be applied. This shows that the appropriate information and communication technologies were bought as it worked quite well, and the telecentre was in full operation. Also note that the farmers used the information and communication technologies for their agriculture-related as well as socio-economic and ICT needs. The community and surrounding communities used the information and communication technologies for their socio-economic and ICT needs.
- "There was some confusion about the ownership of the multifunctional printer, which was confirmed by a pertinent question from the Chairman about "who is the owner of the machines?" I explained to all present that the unit belonged to the water user association (WUA), a legal entity and the owner of the information and communication technologies. I also explained that the WUA would now be responsible for the care and maintenance of the unit. On the subject of caring for the equipment, I explained that "all equipment should be covered and switched off on closing the telecentre at night, as well as during thunderstorms, because the fax would operate via a telephone line during the night.

- "When the computer was installed, the Management Committee thanked me over and over again and from their body language I could see that they were really glad and appreciated the fact that I could obtain funds from a local bank to pay for it "Thank you madam"; "we can not thank you enough"; "we have never heard of the machines"; "we would never have money to buy the machines.
- "During the training I noted that both the trainees were anxious to learn how to operate the computer. Every time the researcher showed them something new, they would exclaim: "Let me try, let me try". This First-World concept of information and communication technologies was adapted by means of simple instructions as of how to use the various programmes on the computer for the farmers".

In conclusion it could be said that these workshops were successful and a great deal of knowledge and experience was gained by both the trainer and the trainees. It was observed that the Thabina community would reap the benefits. Several trips had, though, to be undertaken to Thabina WUA, especially with the computerizing of the financial system in MSExcel. The Management Committee and the farmers' tremendously positive reaction during the entire visit demonstrated their satisfaction and their enthusiasm for the telecentre project.

But with such a comprehensive undertaking, there were special Actions and outcomes that could be seen and should be mentioned as good practice identified. In the next Section, those Actions that could be seen as good practice, are discussed.

7.5 GOOD PRACTICE

This Section will entail those actions that could be seen as good practice with the implementation of the information and communication technologies.

- It was good practice to train the trainees in a hands-on, participatory manner, as it was clear that knowledge is information processed within an existing knowledge framework.. The computer was a new concept to the trainees, as a matter of fact, one of them had never seen a computer. But after training them patiently and steadily, they had the knowledge to operate the computer. These information and communication technologies are also preconditions to bridging the digital divide, because it could be the basis of development.
- It was also good practice to buy a computer. With the computer, their whole management system as well as financial system could be computerised, as they previously had to do it manually, which led to many errors, especially in the calculations. They could now also type various types of documents, and order seed and their various

agriculture-related articles using computer-generated documents. Telecentres have the potential to provide information and communication technologies for development, developing skills, content and services.

- It was also good practice to establish a library as the Management Committee would obtain Internet only when it had the funds. Information needs, including social needs, could be addressed by pamphlets, books and publications from the library.
- It was good practice to buy both the information and communication technologies from the nearest town, because the firm could reach Thabina easily. This means that Thabina did not have to pay excessive travelling expenses, should there be any maintenance problems.

In the above Sections it was described and explained how the establishment of the telecentre commenced and evolved, with reference to those Actions and outcomes that could be seen as good practice. With these Actions completed, Phase 3 could now be evaluated for successes and failures. In the next Section of this Phase, which comprised the actual implementation of the telecentre at the Thabina irrigation scheme, the Phase will be evaluated.

7.6 FORMATIVE PM&E WITH RESULTS, CRITERIA AND RESEARCH METHODS OF THE VARIOUS ACTIONS UNDERTAKEN

With the Actions of this phase successfully undertaken, these Actions are evaluated by means of formative PM&E and the results of these Actions presented in Table 7.1 below.

Table 7.1: PM&E evaluations with results, criteria and research methods of Actions undertaken for Phase 3

ACTION NO	ACTION	PM&E EVALUATION WITH RESULTS	CRITERIA	RESEARCH METHODS
ACTION 1	The appropriate ICT was bought and installed by the vendor (ease of physical world) (June – Aug. 2004).	1. Participatory observation showed that the appropriate information and communication technologies were bought, as those to buy were pointed out by means of the surveys. These appropriate information and communication technologies were purchased due to the fact that the information and communication technologies identified to address both the agriculture-related information needs as well as the socio-economic and ICT needs were identified as the same information and communication technologies, which simplified the process of deciding which to select. 2. Field-notes discussed during the feedback session showed that the Management Committee was satisfied, as they mentioned that the surveys conducted on the agriculture-related needs and the socio-economic and ICT needs indicated that these information and communication technologies could address the information needs of the farmers. If the information and communication technologies bought were not appropriate, scarce monetary resources would be squandered. This would not only harm the project, but could play a definite role in enmity between the farmers and the researcher, and technological innovation.	1. A bottom-up approach was followed: The researcher took the needs and the wishes of the beneficiaries as the starting point. 2. One of the key strengths of the PM&E method is seen to reside in exploring local knowledge and perceptions – researchers take part in research activities as participant observers.	1. Participatory discussions the Management Committee. 2. Participant observation with field-notes during the workshops. 3. Workshops. 4. Feedback sessions

		RESULTS: 1. The participatory discussions regarding the various ICT to be bought as explained in the previous Chapter, Chapter 6, led to the purchase of the applicable, selected ICT.		
ACTION 2	The secretary of the telecentre as well as the Vice-President of the Management Committee were trained (ease emotional world) (Sept. 2004 – Nov 2005).	1. Participant observation indicated that applicable software programmes and training material were bought, as the Management as well as the Financial systems could be computerised. By means of this computerisation the financial dilemma of the WUA was identified and pro-active actions could be taken such as the resulted correspondence with DWA. 2. The secretary of the telecentre as well as the Vice-Chairman of the Management Committee was trained – in an emphatic manner in order for them to grasp these new concepts. By means of participatory observation it was clear that this Action was successful, as the trainees were excited and eager to learn the operation of the information and communication technologies.	1. By involving local, indigenous peoples as research participants in the research in such a bottom-up approach will entail that the researcher takes the needs and the wishes of the beneficiaries as the starting point, rather than to enforce his/her own ideas and interests. 2. One of the key strengths of the PM&E method is seen to reside in exploring local knowledge and	1. Participatory discussions with the Management Committee during participatory discussions and workshops. 2. Participant observation with field-notes during participatory discussions and workshop.

		3. Field-notes showed that the Management Committee was concerned regarding to whom the new information and communication technologies would belong, since they did not have enough funds to buy it themselves. RESULTS: 1. The purchase of the correct and applicable ICT resulted in the fact that the secretary could be trained to the extent that she could computerise the financial system with the MSExcel programme and the management system with the MSWord programme. This proofed to ease the physical world of these small-scale farmers, as every document had to be compiled and recorded by hand previously. As mentioned above, the financial dilemma was identified and pro-active actions were taken with the DWA, which resulted in an Official from DWA to the telecentre in order to familiarise DWA with the problem at hand. 2. Training in the various programmes of the computer resulted in supporting to the sustainability of the telecentre as this assisted the farmers in identifying their financial dilemma, which is common to South African small-scale irrigation schemes, especially those in the former homelands. Due to the identification of their financial system, the Management Committee could immediately take action to solve these problems. 3. Explaining that the ICT belongs to the telecentre, put the Management Committee at ease and the result was that they adopted the telecentre with the ICT as their own	perceptions. 3. The researcher should make it clear that the intervention does not belong to the researcher but that the intervention belongs to the community.	

		and supported the secretary to manage the telecentre and the ICT and looked after it well for the years to come.		
ACTION 3	Formative PM&Evaluation (formative) (Dec. 2005).	1. Participatory observation during the merging of the evaluations of the various Actions during the formative evaluation session at the end of the Phase indicated that the Management Committee was satisfied with decisions taken during this Phase. 2.The field-notes taken through-out the Actions undertaken were merged in the formative evaluations, which lead to the Management Committee appreciating that all their concerns and questions were addressed successfully. RESULTS: 1. These decisions resulted not only in the purchasing of the appropriate information and communication technologies, but also in the successful training of the trainees in the usage and application of these information and communication technologies. 2. The positive reactions of the Management Committee where no special or additional queries of difficulties were noted in field-notes resulted Management Committee to see this Phase as being executed successfully and that the project could progress to the following Phase.	The formative evaluation after completion of phase should be discussed and verified with the Management Committee.	1.Participatory observation with field-notes. 2.Feedback sessions with the Management Committee.

The previous Section formatively evaluated this Phase. In the next Section, this Chapter is summarised.

7.7 SUMMARY

Section 7.1 presented an Introduction to the Chapter, Phase 3. Section 7.2 portrayed the background on how Phase 3 proceeded, with Section 7.3 explaining the various Actions for Phase 3 and evaluation thereof. Section 7.4 offered those Actions taken towards the establishment of a telecentre at Thabina water use association (WUA). Section 7.4.1 described the actual implementation of the telecentre, with Section 7.4.1.1 the installation of the multifunctional printer, with Section 7.4.1.2 on the field-notes and Section 7.4.1.3 the participatory discussions on the field-notes. Section 7.4.1.4 described the purchasing and installation of the computer, with Section 7.4.5.1 on the field-notes taken and Section 7.4.1.6 the participatory discussions on the field-notes. Section 7.4.2 described Action 2, the training of the role-players, with Section 7.4.2.1 explaining the training material and Section 7.4.2.2 other important aspects which were also addressed during these workshops which included a library (Section 7.4.2.14) in the telecentre, and field-notes (Section 7.4.2.15) on the implementation of the information and communication technologies. Section 7.5 explained which aspects dealt with what could be seen as good practice. Section 7.6 evaluated the Phase according to PM&E with results, criteria and research methods. Section 7.7 presents the summary of the chapter.

The previous three Chapters described, discussed and explained the Actions taken regarding how the establishment the Thabina telecentre evolved and progressed. This led to the telecentre then being in a position to operate successfully. The next step was to evaluate this endeavour for successes and failures, which will be undertaken in the next Chapter, Chapter 8.

CHAPTER 8 – PARTICIPANT-ORIENTED EVALUATION PHASE: PARTICIPATORY EVALUATION

8.1 INTRODUCTION

This Chapter forms the last Phase of the four-phase participatory process. The preceding three Chapters, which cover Phases 1, 2 and 3, evaluated the establishment of the rural agricultural telecentre according to the PM&E Method. This leads now to this evaluation Chapter which comprises Phase 4 – the Evaluation Phase, forming the final Phase of the four-phase participatory process for the establishment and evaluation of the rural agricultural telecentre. In this Chapter the previous three Phases, from the identification of agriculture-related information needs which was concluded from the preceding Actions regarding the NPFA which led to the important foundation for the study, the framework applied and Actions undertaken as well as the methodology applied for the establishment and evaluation of a rural agricultural telecentre, are critically evaluated according to the PM&E Method. The participatory evaluations used in this Chapter with the re-evaluation, will indicate whether the four-phase participatory process and the methodology followed for the process were successful and applicable for the establishment and evaluation of the telecentre, or whether another technique should have been followed or another approach should have been applied.

The rural agricultural telecentre operates successfully and with new experience gained during the four-phase participatory process, the new information gathered during the study and additional aspects identified during the observations, the outcome of the project might appear different than was originally anticipated with the establishment of the telecentre. These observations, interpretations and clarifications are considered and evaluated by means of PM&E in this evaluation Chapter.

The PM&E Method used for the establishment of the telecentre and now to be applied for the evaluation of the four-phase participatory process was meticulously examined and thoroughly studied and explained by means of an exhaustive literature search in Chapter 4. This PM&E Method to evaluate the four-phase participatory process is applied in this Phase 4 of the four-phase participatory process by means of the following Sections: Section 8.2 presents a background on how Phase 4 will proceed. Section 8.3 presents a time-line for the Actions for Phase 4 and evaluation thereof; Section 8.4 describes the Actions undertaken during the Phase, and Section 8.4.1 systematically and formatively evaluates the Actions of the Four-phase Participatory Process according

to the PM&E Method (Feuerstein, 1986; Berg, 1998; Estrella *et al.,* 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b), with Section 8.4.2 evaluating the application of PM&E. PM&E that was used for telecentres in this evaluation phase explained in Section 8.4.2.1, in order to capture the most important aspects of the PM&E Method and Section 8.4.3 evaluating the methodology. Section 8.4.4 follows with the PM&E (Feuerstein, 1986; Berg, 1998; Estrella *et al.,* 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b) of the telecentre which was established according to this Four-phase Participatory Process. Section 8.4.4.1 evaluates the telecentre according to nine criteria as prescribed by literature. Section 8.4.3 draws conclusions in collaboration with the Management Committee regarding the environment of the telecentre; the various feedback sessions; and information received and disseminated by the telecentre with sub-sections 8.5.1 to 8.5.4 explaining the environment, the feedback sessions, the information received and disseminated and the visitors to the telecentre. Conclusions are drawn in Section 8.6. This is followed by Section 8.7 which explores how the word regarding the new telecentre at Thabina was spread, followed by Section 8.8 which presents the Conclusions drawn on the success and effectiveness of the telecentre. Section 8.9 renders the Summary of the Chapter.

8.2 BACKGROUND ON HOW PHASE 4 PROCEEDED

With the explanation of the lay-out of the Chapter presented in the Introduction Section, this Section presents an overview of how this Phase 4, the Evaluation Phase, will evolve. The evaluations of this Phase 4 are undertaken according to the PM&E Method identified in Chapter 4 as the most comprehensive and applicable evaluation method for a participatory project. All four the Phases of the four-phase participatory process are each evaluated in order to identify whether these Actions were undertaken according to the participatory school. The telecentre is evaluated by means of criteria identified with special reference to the sustainability factor, as well as in comparison with other telecentres. The importance of conclusions drawn is taken into consideration which leads to an explanation of the most relevant and important aspects relating to the establishment and evaluation of a telecentre found. In conclusion, the success and effectiveness of the telecentre are explained.

The next Section describes these Actions to be undertaken in a time-line format in Figure 6 with a discussion of these Actions, in order to follow when, how and by whom these Actions were undertaken.

8.3 TIME-LINE FOR THE ACTIONS FOR THE EVALUATION PHASE AND EVALUATION THEREOF

Since the various Actions for this Phase were briefly explained in the previous Section, these Actions to be undertaken are presented in a time-line as to when they were undertaken, with a brief discussion on each Action. This Section thus presents the time-line and a brief explanation of the Actions undertaken.

Figure 8.1: Phase 4 – participatory evaluation

PHASE 4 Participatory evaluation: 2006
In this phase the following actions were taken:
Action 1: Formative and summative **evaluation of the Actions undertaken**.
Action 2: **PM&Evaluations**
Action 3: Involvement of the farmers in the **participatory evaluation** of the research by means of discussion: Conclusions drawn.
Data collection methods: Participatory discussions and participatory observations with feedback sessions.

Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

Action 1: Formative evaluation of each of the Actions undertaken during the four-phase participatory process is undertaken – each Action separately in its own context.

Action 2: Evaluation regarding the application of the participatory monitoring & evaluation (PM&E) for telecentres according to the various principles depicted by the PM&E Method; the evaluation of the methodology with a discussion on the applicability and the success of the application of the various theories and models for the creation of the generic four-phase participatory process, from which the four-phase participatory process for the actual establishment of the telecentre was concluded. The evaluation of the telecentre follows: according to various theories, the according to the various sustainability characteristics and components; and according to other telecentres researched.

Action 3: Conclusions drawn from the PM&E in close collaboration with the Management Committee.

This Section presented the time-line of the Actions undertaken in this Phase 4, as well as a discussion on what these Actions would involve. After the various Actions

undertaken in this Phase 4 of the four-phase participatory process have been described, the various Actions are evaluated formatively, which indicates whether each of these Actions were executed successfully and whether the participatory process could commence to the following Action. In the next Section this formative PM&E of each Phase of the four-phase participatory process is explained according to the various Actions undertaken.

8.4 ACTIONS UNDERTAKEN IN PHASE 4

With the various Actions to be undertaken in this Phase described in the above Section, these Actions in the four Phases of the four-phase participatory process are evaluated by means of PM&E. Formative evaluation (De Vos *et al.,* 1991) as promoted by PM&E was conducted and documented throughout each Phase and then discussed in a participatory manner at the end of each Phase during the four Phases of the four-phase participatory process. These PM&E were conducted by the researcher in collaboration with the Management Committee (Weston *et al*., 1995; IDRC, 2007e). The successes of these participatory, formative evaluations which identified problems that occurred and opportunities to grasp (Feuerstein, 1986; Worthen *et al*., 1997) are discussed below.

8.4.1 FORMATIVE EVALUATION OF THE ACTIONS OF THE FOUR-PHASE PARTICIPATORY PROCESS

This Section formatively evaluates the Actions undertaken toward the establishment of the Thabina telecentre.

8.4.1.1 PHASE 1: PRE-ESTABLISHMENT ACTIONS

In this Section the Actions undertaken in the first Phase of the four-phase participatory process are evaluated.

Figure 8.2 - Phase 1: Pre-establishment actions

PHASE 1 Pre-establishment actions 1998 – 2003

In this phase the following actions were taken:

Action1: Preceding actions:

- Identifying communication needs **(1998 – 2000)**
- Approval from Government for the establishment of a telecentre at the Thabina irrigation scheme (Appendices D and E) **(2000)**
- Discussion on a telecentre addressing the information needs **(2001)**
- Discussions on categorising the NPFA into agriculture-related needs **(Jan. 2003)**
- Categorising the communication needs (NPFA) into agriculture-related needs (Appendix C) **(Feb. 2003 - April 2003)**

Action 2: **Discussion of the findings** of the agriculture-related needs with the Management Committee, (analysing the physical and emotional world) **(May – July 2003)**

Action3: The **concept** of a telecentre and which needs it would fulfill were **discussed** with the farmers, including a model to measure usage of the information and communication technologies (develop a solution for the physical and emotional world) **(Aug. & Sept. 2003).**

Action 4: ICTs and printouts from the Internet were **demonstrated** to the Management Committee. (proposal for the physical world) **(Oct. 2003)**.

Action 5: PM&Evaluation - iterative and formative **(Nov. & Dec. 2003).**

Data collection methods: Participatory observation with field-notes and feedback sessions.

Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

- **ACTION 1: PRECEDING ACTIONS**
  - **Identifying the communication needs of the farmers undertaken by Dr. Jon Rutherfoord of a consulting company: 1998 - 2000**

This Phase was completed in approximately 11 months. A thorough study of preceding or prior research (Chambers & Ghildyal, 1985:6) as advocated by the PM&E was undertaken.

In this Phase the first Action was to reassess the everyday farming needs with the research participants, which they expressed during the survey (Pant, 2013) undertaken by Dr. Rutherfoord. This entailed the collection/gathering of information on the farming needs of the community, based on the needs, problems, fears and aspirations (NPFA). This was undertaken when the Thabina Irrigation Scheme applied to the Department of

Water Affairs (DWA) to become a Water User Association (WUA) and the aim was to enable the WUA to inform the DWA of the needs of the newly established WUA:

- Day-to-day management information includes the amount of water used daily/weekly per farmer and financial information regarding payment of water accounts;
- According to a WUAs' Water Management Plan, certain aspects of the plan have to be reported annually to the DWA; and
- Correspondence regarding elections and representation of different population groups.
- The WUA has to pay an annual Catchment Management Charge to the Department of Water Affairs.
- Water must now also be continuously measured in order for the farmers to manage the water efficiently on their scheme.

This outcome was successfully and comprehensively discussed with the Management Committee, regarding the farming needs expressed by the famers during the survey (Pant, 2013) as mentioned in the above paragraph and used as background for the first Phase in the study, as it contained the opinions and suggestions of the farmers regarding their farming needs. With the assistance and support of the Management Committee and Van der Merwe, the researcher successfully categorised the NPFA (Appendix C) according to:

- Infrastructure and land issues (such as the development of the water resource, etc.);
- Service issues (such as information on practical issues like ploughing contractors and Land Bank production loans); and
- General issues (such as improvement of crop production and soil and irrigation management).

- **Obtaining approval from government for the establishment of a telecentre at Thabina irrigation scheme, undertaken by the researcher with role-players: 2000**

The discussion with NPDALE also proved to be successful as NPDALE, as important role-player, included as recommended by PM&E, was so impressed with and convinced of the advantages of a telecentre that NPDALE gave its consent for the establishment of a telecentre at Thabina. This approval from NPDALE also resulted in the ADG of DAFF authorising funding for the study (Appendix D), which resulted in the DAFF funding the accommodation and the travelling costs of the researcher. This optimistic approval formed the basis for the decision to establish a telecentre at Thabina, as the research participants valued and respected the opinion of the former NPDALE, which resulted in the Management Committee giving their approval to establish an information centre at their irrigation scheme (Appendix E).

- **Discussions regarding whether a telecentre could address the information needs of the farmers of the Thabina irrigation scheme, undertaken by the researcher with role-players: 2001**

During the meeting it became evident that the farmers will have to communicate with other WUAs, with DAFF, ARC and the Limpopo Department of Agriculture (NPDALE), as well as farming institutions including Cooperatives, markets, and weather institutions. After a brief participatory explanation, as promoted by PM&E, which included suggestions and questions from the Management Committee, of the information and communication technologies, the meeting agreed that these technologies that could assess, access, manage and disseminate information should be demonstrated to them. The success of this Action lies in the fact that the researcher was able to explain these information and communication technologies successfully with empathy as proposed by PM&E, to the meeting, which resulted in the request of a demonstration of the information and communication technologies as Action 4.

Dr. Rutherfoord also explained the identification of the communication needs (NPFA) which were identified during his assessment. The meeting decided anonymously that these NPFA could form the basis for further research into the current agriculture-related needs of the farmers. The success of this Action lies in the fact that the farmers, after participatory explanations by Dr. Rutherfoord and the researcher in collaboration with the Management Committee as promoted by PM&E, concluded that their needs have not

changed – these NPFA was similar and comparable enough to their current needs in order to deduct the current agriculture-related needs from this NPFA.

Since a telecentre enables communication by means of the information and communication technologies, the researcher explained the concept of a telecentre by means of participatory conversations, where the many questions, remarks and suggestions of the Management Committee were incorporated in the explanations by the researcher, as recommended by PM&E. This Action proved to be successful, as the meeting anonymously decided that the concept of a telecentre should be explained to them in detail, which resulted in the positive agreement to establish a telecentre at the Thabina irrigation scheme after participatory discussions (Action 3).

- **Discussions on categorising the NPFA for the identification of agriculture-related needs, undertaken by the researcher with role-players: 2003**

In Section 5.4.1.2 it was explained that all role-players decided that the NPFA should be used in the identification of the agriculture-related information needs of the local community. The Management Committee, a Senior Official from DWA and the researcher categorised these NPFA into:

- Infrastructure and land issues;
- Service issues; and
- General issues.

This categorisation was successful due to the fact that participatory and interactive discussions and decisions, as suggested by PM&E, were made by these role-players which led to the next Action, Action 1 part 2, as discussed in the next Section.

- **Agriculture-related needs identified, concluded from the NPFA, undertaken by the researcher with role-players. Action 1 part 2: May and June 2003**

As preceding actions, the NPFA was categorised into agriculture-related needs in collaboration with the Management Committee, the Extension Officer and a Senior Official from the DWA (Appendix C). It was necessary to identify the agriculture-related needs, in order to identify the information and communication technologies to address these information needs, as the aim of the telecentre would be for the farmers to be able

to communicate with the DWA and other agricultural departments and institutions regarding their needs.

The success of this Action was due to the fact of selecting knowledgeable role-players, as promoted by PM&E, in the identification of the agriculture-related needs: The Extension Officer and the Management Committee provided the most contributions regarding the identification of the agriculture-related needs from the NPFA as the Management Committee was acquainted with the current needs and problems of the WUA, as this was the major dilemma of the farmers at that stage. The Senior Official from the DWA – as Chief Engineer responsible for both irrigation of agricultural crops and water resource management (the development of irrigation schemes, including Thabina, for resource-poor farmers) – provided important information regarding the rules and regulations of the NWA which the WUA had to adhere to.

Participant observation with field-notes indicated that categorising the NPFA into suitable categories (Infrastructure and land issues; Service issues; General issues) not only simplified the understanding of these NPFA by the Management Committee, but resulted in the successful identification of agriculture-related needs, each with its own information source and ICT to address the specific need. This resulted in the identification of the appropriate information and communication technologies to be purchased in order to address not only these agriculture-related needs, but also the socio-economic and ICT needs as identified in Phase 2 of the four-phase participatory process.

- **EXPLAINING THE FINDINGS OF THE IDENTIFIED AGRICULTURE-RELATED INFORMATION NEEDS, undertaken by the researcher with role-players: May – July 2003: Action 2**

The agriculture-related needs derived from the farming needs of the farmers (Cornwell & Jewkes, 2007) were researched, analysed and discussed comprehensively (Pant, 2012) in collaboration with the Management Committee, as promoted by the PM&E. By means of participatory observation (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) it was noted that not only their questions and suggestions, but also their body-language and facial expressions, revealed their satisfaction (World Bank, 2012) with the fact that their agriculture-related needs could now be addressed. These observations were substantiated by the fact that the Management Committee expressed their gratification, as they realised that this successful categorising and ascertaining of the agriculture-

related needs of the farmers, also effectively resulted in the successful identification of an information source as well as an information and communication technology to address each need, problem, fear and aspiration. By interpreting results (Adams & Garbutt, 2013b) this Action also seemed successful, since with feedback (De Vos *et al.,* 1991; World Bank, 2012) during the feedback sessions, comprehensive discussions (Pant, 2012) on these agriculture-related information needs with the Management Committee, led to the fact that these agriculture-related needs were authenticated by the Management Committee (Pant, 2012).

- **INTRODUCING THE CONCEPT OF A TELECENTRE: Action 3**

Since the Management Committee had no knowledge regarding a telecentre, this concept was successfully introduced to the Management Committee. Participatory observation, as recommended by the PM&E (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) where not only the verbal expressions, but also their facial expressions were noted, indicated that the research participants agreed (World Bank, 2012) with the establishment of a telecentre at their irrigation scheme, which confirmed the letter of the Chairman (Appendix E) of 2000 in which he expressed that the farmers do need a telecentre at their irrigation scheme, as explained in Chapter 5 in Sub-section 5.4.1.2. With the establishment of the WUA, the farmers at the Thabina irrigation scheme expressed to Perret *et al.* (2002) who undertook a survey at Thabina, that they would need a 'telematic centre' – which is in line with Gomez *et al.* (2001a) and the IDRC (2007), who recommend that the research participants should be involved in the decision-making process.

The success of this Action was also due to the illustration used by the researcher of the wagon (community) being pulled from the mud (NPFA), as this telecentre could free the farmers from their dilemmas as indicated in the agriculture-related information needs concluded from their needs, problems, fears and aspirations (NPFA).

- **DEMONSTRATION OF THE INFORMATION AND COMMUNICATION TECHNOLOGIES: Action 4**

During participatory discussions and explanations, as promoted by PM&E, the researcher explained the concept of the information and communication technologies to the Management Committee. This Action had a positive outcome, as the Management

Committee approved and agreed (World Bank, 2012) with the establishment of a telecentre at their irrigation scheme. By means of participatory observation (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) it was noted that by means of interpreting results (Adams & Garbutt, 2013b) the usage of recognisable symbols, as suggested by PM&E as well as print-outs, integrating the indigenous culture of the community, as promoted by Mikkelsen (1995) and Berg (1998), definitely supported the descriptions for explanatory purposes, as this led to the research participants understanding the operation of the technologies.

During this demonstration of the functioning and managing of the computer, the benefits and advantages as well as the type of information that could be obtained from the information and communication technologies were successfully and comprehensively (Pant, 2012) explained to the Management Committee, as advised by PM&E. This process took place in a participatory manner. Participatory observation (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; 2013 World Bank, 2012; Pant, 2013) confirmed that this participatory process was constructive, as the Management Committee expressed their own ideas enthusiastically and asked questions such as: “How big must the office be?”; “How big are the machines?” (computer and multifunctional printer); “Who will operate them?” (computer); “Who will teach us to operate these machines?” (computer and multifunctional printer); “Can we print from the machine (computer) to the printer?”; “How will we get these machines to Thabina, who will bring them?”; “We will have to insure them, because we have theft here at Thabina”. This demonstration proved to be effective as the decision was made (Berg, 1998; Schenk & Grobler, 2009) that the agriculture-related needs could be addressed by means of the information and communication technologies of a telecentre.

- **FORMATIVE EVALUATIONS OF THE PHASE: Action 5**

Formative evaluation was undertaken during the feedback session as recommended by PM&E, according to the theories of Guijt (1998) and Estrella *et al.* (2000) during as well as at the end of the Phase in multicultural dialogue (Schenk & Grobler, 2009) with the Management Committee (Adams & Garbutt, 2013b). Questions raised and suggestions made were all discussed in a participatory collaboration with the Management Committee and no further corrective Actions (World Bank, 2012; FAO, 2013) were

suggested to be undertaken. Interpreting the results (Adams and Garbutt, 2013b) of the Phase, it meant that this Phase was successfully completed, as the Management Committee repeated their need for a telecentre which the Chairman had expressed in 2000, for the establishment of a telecentre, based on information and communication technologies. The successful completion of this Phase was also due to the good rapport (De Vos *et al.,* 2001) and positive attitudes towards the project, received by the researcher from the Management Committee.

8.4.1.2 PHASE 2: PREPARATORY ACTIONS BEFORE THE ESTABLISHMENT OF THE TELECENTRE

This Phase was completed in eight months. In this Phase the aim was to approve of the various documents drafted in collaboration with the Management Committee, as PM&E advises and also to identify the appropriate information and communication technologies to address the socio-economic needs (Freire, 1994) such has computer literacy (ICT needs), literacy, health-care aspects such as HIV/Aids, child nutrition and vaccination of the children and lectures by the clinic, of not only the community of the Thabina irrigation scheme but also the surrounding communities.

Figure 8.3 - Phase 2: Preparatory actions before the establishment of the telecentre

PHASE 2: Preparatory actions before the establishment of the telecentre:
October 2003 – May 2004

In this phase the following actions were taken:

Action 1: **Draft documents** such as the Project Plan and how to manage a telecentre were **compiled** in collaboration with the Management Committee (analysing the emotional world) **(Dec. 2003 – Feb.2004).**

Action 2: During **structured interviews** the farmers' socio-economic and ICT needs were determined (analysing the emotional world) (Appendices G, H,I) **(March 2004).**

Action 3: Participatory discussions regarding the **findings** of the interview schedule and **identifying ICT** (simplify physical world) **(April 2004).**

Action 4: **PM&Evaluations – iterative and formative** **(May 2004).**

Data collection methods : Feedback sessions, structured interviews and participatory observation with field-notes.

Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

- **DRAFT DOCUMENTS SUCH AS THE PROJECT PLAN AND HOW TO MANAGE A TELECENTRE WERE COMPILED IN COLLABORATION WITH THE MANAGEMENT COMMITTEE: Action 1**

Analysing the emotional world: Preparatory Actions to establish the telecentre were successfully undertaken. This meant that documents such as the project plan and a document on how to manage a telecentre were compiled in collaboration with the

Management Committee as suggested by PM&E, in an emphatic manner, as advocated by Schenk and Grobler (2009). The researcher drafted the documents successfully, as it was approved by the Management Committee: During participatory observation (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) while some changes, recommendations and suggestions were made by the Management Committee during these participatory discussions (IDRC, 2007e; Coady International Institute, 2014) of the documents, it was noted that the Management Committee did not have any previous experience in compiling such documents and their suggestions and questions asked had to be dealt with thoroughly. By the end of the meeting the Management Committee agreed upon (World Bank, 2012), approved and accepted these documents. The appointment of a secretary, as suggested by the Management Committee, was successful. The reason being that the secretary, could successfully be trained in the usage of the information and communication technologies as she had some experience of the computer and also because she ultimately could manage to assist to computerise both the management system and the financial systems.

- **DURING STRUCTURED INTERVIEWS THE FARMERS' SOCIO-ECONOMIC AND ICT NEEDS WERE DETERMINED (APPENDICES G, H,I): Action 2:**

Analysing the emotional world: Structured interviews were held with the farmers to determine their socio-economic and ICT needs, as urged by Lahiff (2000) and Shah *et al.* (2002). After comprehensive conversations (Pant, 2012) with the Management Committee as part of the PM&E, an interview schedule (Appendix F) to complete during these structured interviews was successfully compiled and agreed upon (World Bank, 2012) as the research participants could understand and complete the answers. The success of this Action was also due to the fact that during these structured interviews, farmers were asked whether they could understand the interview schedule to be able to complete it, giving each participant his own time to complete (Schenk & Grobler, 2009). Notes of the following questions were made during participatory observation (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) such as: "Can we as women also learn to operate the machines?"; "What language does the machines use?"; "I cannot read and write, who will tell me what the machines says?"; "But I do not understand English, who will tell me

what to do?" By means of participatory observation (by theorists explained above) as data collection method of the PM&E, it was also noted that the course of the meetings was successful as the research participants were enthusiastic to complete the interview schedule in a relaxed atmosphere. Participatory observation (by theorists explained above) revealed that this relaxed and stress-free atmosphere was due to the fact a 'happy song' that was sang with each opening, as well as the food prepared by the Women's Forum, as the research participants showed their appreciation by thanking the researcher repeatedly. Although various questions were asked during the course, such as: "I do not understand how to name the answers"; "Why are here so many squares?"; "I do not understand Tsonga, I am a Sotho", they were addressed immediately by the researcher. PM&E (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; Adams & Garbutt, 2013b; FAO, 2013) at the end of the phase during the feedback session (De Vos *et al.,* 1991; World Bank, 2012) showed that the completion of these structured interviews were successful, as 100% of the survey population attended. The use of sketches, as proposed by Mikkelsen (1995) and Berg (1998) in order to support the questions, was also a success, as the interpreters frequently referred to the sketches to explain the specific question. This is also in line with Freire (1994) who suggests that the facilitator should use creative techniques, such as pictures to assist research participants in understanding information unfamiliar to them. It was also an effective idea to confirm the connotation of the sketches to the specific question. When the farmers were asked what these various sketches meant to them, and if they could relate it to the various questions it supported, the answer was affirmative, even from the illiterate farmers, which had the questions translated by the two field workers who were used as interpreters.

- **PARTICIPATORY DISCUSSIONS REGARDING THE FINDINGS OF THE INTERVIEW SCHEDULE AND IDENTIFYING ICT: Action 3:**

Studying the outcome of the emotional world: During the participatory observations (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) while discussing the findings of the structured interviews during detailed discussions (Pant, 2012) with the Management Committee with field-notes, (Chapter 6) as recommended by PM&E, the researcher noted that the Management Committee repeatedly referred to incorporation of the sketches and the interpreters, expressing their satisfaction that this led to the research participants playing

an important role in the identification of their socio-economic and ICT needs. With the identification of the appropriate information and communication technologies to address these needs, the researcher noted through participatory observation (by theorists as explained above) that the Management Committee repeatedly referred to the 'telematic centre' asked for by the farmers, as proposed by PM&E: This led to the agreed (World Bank, 2012) successful identification of the computer and multifunctional printer for the telecentre to be purchased (ease physical world).

- **PM&EVALUATIONS – ITERATIVE AND FORMATIVE: Action 4:**

Interpreting the results of this Phase (Adams and Garbutt, 2013b) during the formative feedback session (Estrella, 2000; Coryn, 2011; World Bank, 2012) with the Management Committee as proposed by the PM&E, the Management Committee made the assumption that all farmers attending were positive regarding their 'telematic centre' (Perret *et al*., 2000) as all research participants of the survey population (Du Plooy, 1995:50) attended and completed the interview schedule. All questions, remarks and ideas were noted and incorporated, which made the evaluation of this Action person-orientated (Schenk & Grobler, 2009). The Management Committee also agreed, as suggested by PM&E (World Bank, 2012), that this Phase was successful as they have, according to the PM&E, contributed (Schenk & Grobler, 2009) to the compilation of the various documents (project plan, management of the telecentre, and the interview schedule) and the prompt manner in which the interpreters could explain the questions of the interview schedule with the aid of the sketches, to the research participants. No corrective actions (World Bank, 2012) were suggested.

8.4.1.3 PHASE 3: ESTABLISHING THE TELECENTRE

This phase was completed in 19 months. This was due to the enthusiasm of the Management Committee regarding the outcome of the interview schedule, and also to the swift manner in which the decisions were made regarding the information and communication technologies which would be appropriate and affordable.

Figure 8.4 - Phase 3: Establishing the telecentre

PHASE 3 Establishment of the telecentre:
May 2004 - Dec 2005

In this phase the following actions were taken:

Action 1: The appropriate ICT was bought and installed by the vendor (ease of physical world) **(May - Aug. 2004).**

Action2: The secretary of the telecentre as well as the Vice-President of the Management Committee were trained (ease emotional world) Additional aspects of the telecentre handled (Appendices J, K, L, M, N) **(Sept. 2004 - Nov. 2005).**

Action 3: PM&Evaluations – iterative and formative **(Dec. 2005).**

Data collection methods : Feedback sessions, training sessions and participatory observations with field-notes

THE APPROPRIATE ICT WAS PURCHASED AND INSTALLED BY THE

Source: Researcher's compilation derived from the generic four phase participatory process, in collaboration with the role-players

- **VENDOR: Phase 3: Action 1**

Ease of physical world: During the establishment of the telecentre, the information gathered from the structured interviews was processed (Chapter 6 – Establishment Phase). By means of participatory observation as promoted by PM&E (De Vos *et al.*, 2001; Henning *et al.*, 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013) the researcher concluded that the Management Committee was satisfied with the findings presented to and discussed with them during the feedback session (Estrella, 2000; Coryn, 2011; World Bank, 2012) because the Management Committee (IDRC, 2007e) agreed (World Bank, 2012) that the socio-economic and ICT needs identified from the interview schedules were consistent with the viewpoints of the farmers (Schenk & Grobler, 2009). During the Establishment Phase the Management Committee decided, in collaboration with the researcher as advised by PM&E, that a computer and a multifunctional printer would be appropriate to buy in order to address not only the agriculture-related needs as identified in the first phase, but also the socio-economic and ICT needs as identified in the structured interviews.

- **THE SECRETARY OF THE TELECENTRE AS WELL AS THE VICE-PRESIDENT OF THE MANAGEMENT COMMITTEE WAS TRAINED. ADDITIONAL ASPECTS OF THE TELECENTRE HANDLED (APPENDICE H, I, J, K, L): Action 2**

The Vice-Chairman and the secretary were successfully trained in the operation of the computer, according to the theories of Conradie (1998); Benjamin *et al.* (2000) and Scharffenberger (2001) who explained that users of the information and communication technologies of a telecentre should be trained in the usage thereof. During the training sessions, the researcher noted by means of participatory observation as proposed by PM&E (De Vos *et al.,* 2001; Henning *et al.,* 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013), that both the trainees were excited

about their training, as they listened carefully and immediately tried every aspect demonstrated. Even the Vice-Chairman practiced the usage of the keyboard from the manual for hours. The secretary agreed, as the World Bank (2012) propose that the all role-players should agree, that she had greatly benefitted from her training in the operation of the information technologies – which was evident in the way the operated the management and financial systems and also how she could assist the community and surrounding users of the telecentre, with the information and communication technologies.

Since Pant (2013) propose that all actions should be undertaken systematically, the researcher, in collaboration with the secretary, researched and looked into the financial situation of the WUA. In collaboration with the Management Committee, as advised by the PM&E, the researcher noted by means of participatory observation as advocated by PM&E (De Vos *et al*., 2001; Henning *et al*., 2004; Chicago School of participatory Observation, 2007; World Bank, 2012; Pant, 2013), that the members of the Management Committee seemed anxious and concerned as they had, during previous participatory discussions (Gomez *et al.* 2001a; IDRC, 2007a; Coady International Institute, 2014) mentioned that the WUA had a shortage of funds. The researcher was correct in her interpretation as the financial statements showed clearly that a computer could not be afforded. The Management Committee decided to start off with a multifunctional printer. Another success was that the researcher was able to obtain R10 000 from a local bank and a computer was purchased. A positive result was that with the computerising of the management system and the financial system by the secretary with the support of the researcher, the alarming financial situation of the WUA was also brought to the attention of the Management Committee, and corrective actions, as advised by PM&E (World Bank, 2012; FAO, 2013) had to be imposed immediately: The financial system, which included the total monthly income, total monthly arrears, and extent of arrears for each farmer (Appendix H) as well as the WUA payment of the annual Catchment Management Charge to the Department of Water Affairs and also the business system such as income and expenditure, showed alarming financial arrears that had to be addressed. This seemed to be due to the fact that the farmers did not pay the monthly levy to the telecentre, to be paid to the DWA. The Management Committee immediately arranged urgent meetings with a Senior Official from the DWA to discuss corrective actions as indicated by PM&E (World Bank, 2012; FAO, 2013) to be taken.

- **PM&EVALUATIONS – ITERATIVE AND FORMATIVE: Action 3**

The compilation of this Section took ten months. This was due to the fact that valuable, appropriate and useful field-notes, as suggested by PM&E (Du Plooy, 1995; Berg, 1998; De Vos *et al.,* 2001:277) made during the course of the project and formative PM&E undertaken at the end of each phase were collated, organised and checked (World Bank, 2012) in collaboration with the Management Committee.

8.4.1.4 PM&E Evaluation

The formative PM&E (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b) at the completion of each Phase was done by means of participatory discussions as recommended by PM&E (Gomez *et al.* 2001a; IDRC, 2007e; Coady International Institute, 2014); debates and conversations (Estrella, 2000; Coryn, 2011) with the Management Committee; and the interpreting of the results as directed by PM&E (Adams and Garbutt, 2013b) of the phase. By means of participant observations, as advocated by PM&E (by researchers explained above) the researcher found that these Actions proved valuable, as it led to the farmers feeling involved in the project as advised by PM&E (Gomez *et al.* 2001b; IDRC, 2007e): With their new, applicable knowledge (Bekenstein, 2003; FAO, 2006; McCarthy, 2006; Jones, 2011; Adams & Garbutt, 2013b) the farmers took ownership of the project with the aim of establishing a telecentre at their irrigation scheme.

The adaptation of the generic four-phase participatory process for the establishment of a telecentre at Thabina was successfully carried out, which led to this applicable, workable four-phase participatory process. Since the goals and objectives of the study have been reached by means of the conscientious and precise application and following of the consecutive phases of the four-phase participatory process, there is no other conclusion and outcome to be derived that this four-phase participatory process followed for the establishment of an agricultural telecentre, was a success. It could also be concluded that the success of the four-phase participatory process lies in the application of the PM&E Method (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b) which was applied throughout the four-phase participatory process, in order to identify the success/failure of each Action, as well as forming the basis for the summative evaluations at the end of the project. It is also accurate then that the generic four-phase participatory process could

be considered, adapted and applied for the establishment of a telecentre, a Cooperative, a Trust or any Community Development Programme nationally and internationally.

This Section evaluated the success of the various consecutive, interactive Phases executed according to the four-phase participatory process, as concluded from the generic four-phase participatory process developed in Chapter 4. With the conclusion and outcome that these Phases were executed successfully, the Chapter can now commence to the actual PM&E of the various aspects of the project regarding the establishment of the telecentre at the Thabina irrigation scheme. The next Section will present an explanation of the application of the PM&E Method for telecentres.

8.4.2 EVALUATING THE APPLICATION OF THE PARTICIPATORY MONITORING & EVALUATION (PM&E) FOR TELECENTRES

Participatory monitoring and evaluation was chosen for this project to enhance the participatory methodology used and also because it involves the farmers as stakeholders and beneficiaries of the project in the evaluation of the project (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b). Researchers such as McConnell (2007) and Kyabwe and Kibombo (2011) agree on involving the farmers as research participants and note that with the participatory monitoring and evaluation paradigm these beneficiaries as research participants play a pivotal role in the evaluation process and that they are not only objects of the evaluation. The participatory monitoring and evaluation (PM&E) chosen to evaluate this four-phase participatory process of the establishment of the agricultural telecentre at the Thabina irrigation scheme is thoroughly and systematically discussed and explained in Chapter 4 in Section 4.2.4 under the heading 'Identifying a research instrument for the evaluation of a participatory project'. Below are a few facts and statements regarding the principles of the PM&E Method used for the evaluation process of the establishment of the Thabina telecentre.

Firstly the importance of PM&E in addressing the needs of the farmers of Thabina is explained below in the next Sub-section.

- **Addressing needs of the research participants**

Two thorough needs assessments, as proposed by PM&E, were undertaken at the Thabina irrigation scheme with the objective to identify the information and communication technologies which could address all needs of the farmers. Firstly, the

agriculture-related information needs, concluded from the NPFA, were refined in Chapter 5 in order to identify the information and communication technologies that could address these needs. In the following phase of the four-phase participatory process, in Chapter 6, the socio-economic and ICT needs of the farmers were identified by means of an interview schedule. The outcome of these two assessments (agriculture-related information needs and the socio-economic and ICT needs) showed that the information and communication technologies to address these two sets of needs were similar. The outcome was that the appropriate information and communication technologies that could address all these needs of the farmers of the Thabina irrigation scheme were identified, purchased and installed. The information and communication technologies comprised a telephone, a multifunctional printer and a computer, which proved to be functional and practical, as the questionnaires on the usage of these information and communication technologies showed that they were used optimally (Section 8.6.4). The farmers also confirmed that the telecentre, based on these information and communication technologies, was a great advantage.

These output measures, writes McConnell (2007:97) "provide the critical test for telecentre evaluation": The telephone was the technology used the most, and was also available before the establishment of the telecentre, therefore the effectiveness of the usage of the telephone was evaluated in 2006 by means of a questionnaire (Appendix N). Since the usage of the multifunctional printer and the computer was only available since the establishment of the telecentre, the usage thereof was measured in 2007 (Appendix M) as will be discussed in this Chapter. Harris (2001:89) calls on the reader to focus on identifying "output measures", which "relate to the additional benefits that the community enjoys as a result of utilizing the services of the center". A variety of additional benefits enjoyed by the users of the Thabina telecentre are listed in Chapter 7 in Section 7.4.2.2 under the heading 'Other important issues addressed during these workshops'.

This evaluation shows that the impact of the community having access to the information and communication technologies led to the Thabina community being able to communicate with other institutions, Departments and agriculture-related organisations, as well as to assess, access, manage and disseminate information by means of the information and communication technologies.

- **Evaluation throughout the lifespan**

The PM&E discusses the importance of participatory monitoring and evaluating of telecentre projects throughout their lifespan (Pant, 2012). The establishment of the Thabina telecentre was evaluated throughout its lifespan by means of iterative formative evaluations after each Action and which were then discussed in feedback sessions – throughout the four participatory phases which commenced with the Phase of the preceding Actions until the establishment of the telecentre as such. During each Action, and at the end of each Phase, successful formative evaluations were undertaken with the Management Committee during feedback sessions. These sessions could be seen as successful, as the field-notes taken during the Actions were also discussed during these formative evaluations in feedback sessions and this valuable information obtained from the farmers and the Management Committee was included in the following Actions to be undertaken.

With an explanation of the importance of evaluation throughout the project, the importance of this feedback will be discussed in the next Section.

- **PM&E applied to provide feedback**

The above Section identified the important role of feedback during a participatory project. This Section will describe the application of the information obtained by means of these feedback sessions.

The aim of applying participant-oriented evaluation is to provide feedback (Henning *et al.,* 1994; Berg, 1998 World Bank, 2012) to the stakeholders of a project, including sponsors, donors, administrator, staff, etc. During this study the importance of including the farmers in the monitoring and evaluation process itself, as indicated by PM&E (Estrella & Gaventa, 1998; Knowledge Base, 2007a) was applied. The comments and observations from the Management Committee during feedback sessions were included (Estrella, 2000; Coryn, 2011; World Bank, 2012) as suggestions and ideas for the next Phase as recommended by PM&E. This led to the good rapport established between the researcher and the Management Committee as well as with the farmers as research participants. This good rapport led to the valuable cooperation with the farmers where useful information regarding their agriculture-related information needs could be identified as described in Chapter 5.

This Section evaluated the important role that the feedback sessions played in the participatory process of the establishment of the telecentre. Another function of the

telecentre that will be evaluated is the important role of compiling and submitting regular reports, which will be discussed in the next Section.

- **To submit regular reports**

Owing to the fact that the Thabina irrigation scheme was transformed to a WUA, the telecentre was obliged to submit several reports to the DWA as stipulated by the NWA. This Section will explain the importance of the submission of regular reports by the Thabina telecentre.

Young *et al.* (2001) suggest that telecentres are compelled to compile and submit regular reports, which is in line with Kyabwe and Kibombo's (2011) recommendation for maintaining updated user records and recording daily usage data. This is especially true regarding the South African agricultural telecentre at the WUA, as all WUAs are now obliged by the NWA to submit information from the various irrigation aspects such as explained by Van der Merwe (2007) in Chapter 1 in Section 1.5 under the heading Definition of Terms as well as in Chapter 3 in 3.5. With the support of the information and communication technologies, the Thabina telecentre could adhere fully to these rules and regulations of the NWA and submitted their reports to the DWA on a regular basis, as explained in Sub-section 4.2.2 in Chapter 7.

The secretary also submitted the financial statements to the Management Committee on a monthly basis. This included not only the financial statements regarding the financial situation of each of the farmers, but also the income and expenditure of the telecentre as such.

This Section evaluated the importance of submitting the regular reports to the Management Committee as well as the DWA. But another most important aspect of the telecentre to evaluate is the fact that the needs of the farmers should be addressed. The needs of the farmers of the Thabina irrigation scheme could be addressed by means of their newly purchased information and communication technologies, as will be described in the next Section.

This Section evaluated the actions undertaken which led to the successful addressing of the needs of the farmers. But the needs of the farmers could only be successfully addressed if the views of the farmers were taken into consideration. This aspect will be discussed in the next Section.

- **Taking into consideration the views of the research participants**

The participatory discussions, as advocated by PM&E, regarding the opinions, suggestions and ideas of research participants (farmers) were successfully taken into consideration during the evaluation of the study, as each aspect was discussed with them in a participatory manner and in detail (Schenk & Grobler, 2009). This method led to the identification and positive results of questions asked regarding the identification of both the agriculture-related information needs and the socio-economic and ICT needs: In Chapter 5 in Section 5.5 on 'Agriculture-related needs identified, concluded from the NPFA' it was noted that it is important to include all role-players in deciding which questions are to be asked, how to answer them and to decide on each participant's role in the evaluation process (Feuerstein, 1986; Schenk & Grobler, 2009) because these NPFA was revealed and expressed by the farmers themselves during preceding actions undertaken at Thabina. In Chapter 6 in Section 6.3 on 'Determining the socio-economic and ICT needs of the farmers' all suggestions and recommendations by role-players led to an informative interview schedule. The outcome of these two assessments led to the positive identification of the needs of the farmers and also to the purchase of the information and communication technologies which could address these needs.

The evaluation of taking the views of the research participants was undertaken in this Section. This evaluation leads to the evaluation of the next important aspect regarding a telecentre, namely whether the research participants were actively involved in the project process.

- **Research participants should be actively involved**

This function of PM&E highlights the active involvement of the community as research participants (Gomez *et al.* 2001a; IDRC, 2007a) as they are the people to profit and gain from the investment (Estrella & Gaventa, 1998). The quality of the PM&E process depends greatly on who is involved, and how they are involved, at each Phase (Estrella *et al.,* 2000; Pant, 2013). During this study each Phase of the four-phase participatory process, the research participants (Management Committee as well as farmers – literate and illiterate) were actively involved and their suggestions, remarks and questions were meticulously noted in field-notes (Du Plooy, 1995; Berg, 1998; De Vos *et al.,* 2001:277), as suggested by PM&E. Each Phase was evaluated with the evaluations discussed with the Management Committee (Berg, 1998; De Vos *et al*., 2001; Schenk & Grobler, 2009) in the form of providing feedback to the research participants (Estrella, 2000; Coryn, 2011 World Bank, 2012) on these suggestions and ideas of the farmers. These

comments from the research participants were included when feedback (Estrella, 2000; Coryn, 2011; World Bank, 2012) was discussed and suggestions and ideas for the next Phase were considered. It could be concluded then that the four-phase participatory process adhered successfully to the fact that the research participants should be actively involved in the decision-making process.

Since this active involvement of the research participants was discussed throughout the participatory project during the feedback sessions, the next Section will discuss the evaluation of the field-notes as such.

- **Evaluation of field-notes for feedback sessions**

As suggested by Estrella and Gaventa (1998) and confirmed by Coryn (2011), the stakeholders should become their own evaluators. Therefore feedback sessions were held with the Management Committee after the completion of each Action as well as at the end of the Phase in the form of formative evaluations. Estrella and Gaventa (1998) suggest that the field-notes that were made throughout the project with questions asked and guided discussions, be seen as the researcher's version of what is 'there', add Henning *et al.* (2004) and that these observations form the basis of the feedback sessions. At the end of each Phase of the four-phase participatory process, the field-notes (Estrella, 2000; Coryn, 2011; World Bank, 2012) of the Phase were conferred with the Management Committee in participatory discussions (Gomez *et al.* 2001a; IDRC, 2007a; Coady International Institute, 2014) in order to determine if the derivations were correct and to include their suggestions (Gomez *et al.* 2001b; IDRC, 2007a). The Management Committee mostly agreed with the field-notes, but did, though, sometimes add more detail or suggestions by the farmers not noted by the researcher. Overall it could be said that these field-notes were complete and that these field-notes could be applied in the discussion for the undertaking of the next Action.

The application of PM&E, as suggested by various researchers and theorists of the PM&E school (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b) for the evaluation of telecentres, was discussed and explained in this Section. With the PM&E Method for the evaluation of telecentres explained, the evaluation of the methodology according to which the telecentre is established, will be discussed in the next Section.

8.4.3 EVALUATING THE METHODOLOGY

With the PM&E identified as the most suitable evaluation method in Chapter 4, the methodology applied and followed for the establishment of an agricultural telecentre could now be evaluated according to the PM&E. The generic four-phase participatory process which was developed (Berg, 1998; Kirsten and Van Zyl, 1998; De Vos *et al*., 2001; Greenidge, 2004:2; Heeks, 2004:3; USAID, 2004; Van Averbeke, 2006; Schenk & Grobler, 2009) in Chapter 4 was adapted to the situation at the Thabina irrigation scheme in order to establish an agricultural telecentre at Thabina. This four-phase participatory process could also be applied to the establishment of any other applicable institutional structure such as a WUA, a Trust, a Cooperative, a Community Property Association and many similar organisations being established by means of the participatory approach. The PM&E (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al*., 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b), with the feedback sessions (Estrella, 2000; Coryn, 2011; World Bank, 2012) presented to the Management Committee after each Action, showed the success of the methodology followed.

The first undertaking of this participatory project was to create a generic four-phase participatory process according to which an intervention such as a telecentre, as well as a Trust, a Cooperation or a Community Development Programme could be established and evaluated. The methodology applied for the creation of a generic four-phase participatory process according to which a telecentre could be established and evaluated, will be evaluated in the next Section.

- **Creating a generic four-phase participatory process**

The methodology of the establishment and evaluation of the telecentre, undertaken according to a four-phase participatory process, commenced with a meticulously exploration of 19 Project Management theories. Models and theories of the Traditional Approach, the Agile Model, the PRINCE2 Model and the Extreme Project Management (xPM) (2015) were identified and applied, which led to the accurate and well-planned construction of the framework for a generic four-phase participatory process. In Section 4.3.1 of Chapter 4 approaches from these methods were selected and analysed and those found suitable for the creation of a frame work for a four-phase participatory process were applied to the creation of a framework for the establishment of a telecentre in Section 4.5.

With a framework for the participatory process secured and in place, an explanation of theories according to which the processes (actions) of the four phases could be undertaken within this framework, followed. This discussion entailed models of the Participatory research compared with conventional research, Research regarding the agricultural sector, The Transfer-of-Technology Model and An Alternative Model: Farmer-First-and-Last. This discussion presented valuable and practical information on what the Actions should entail for the establishment of a telecentre. Theories and approaches used for the identification of Actions for the generic model of the four-phase participatory process were identified in Section 4.3.2 of Chapter 4. This action was successful, as those Actions analysed and found suitable to be applied to the framework of a four-phase participatory process for the establishment of a telecentre as such, were successfully categorised into the framework in Section 4.2.2 of Chapter 4.

In conclusion it could be said that these two successful and effective procedures of the methodology not only led to the creation of a framework with Actions to be undertaken for a generic four-phase participatory process, but also to the successful establishment and evaluation of a telecentre at the Thabina irrigation scheme. The establishment of the Thabina agricultural telecentre was undertaken according to a four-phase participatory process concluded from the generic four-phase participatory process and applied to the rural farmers of the Thabina irrigation scheme. In the next Section the data collection methods used for this four-phase participatory process will be evaluated.

- **Data collection methods**

Various data collection methods were used by means of qualitative measures such as participatory observation with field-notes, structured interviews and feedback sessions. Quantitative measures such as questionnaires on the usage of the various information and communication technologies were undertaken: one on the usage of the telephone, and one on the usage of the information and communication technologies. The outcome showed that the telephone was the most popular information and communication technology. Usage on the computer and multifunctional printer showed that the income generated exceeded the expenditure, and that the telecentre could be financially sustainable. These data collection methods of the participatory project, as explained in Section 4.2.5 of Chapter 4, proved to be constructive and functional as the field-notes taken during the participatory observations led to active discussions during the feedback sessions with the research participants. The participatory observations with field-notes

proved to be successful as these field-notes, as discussed above in Section 8.5.7, proved to be a highly sufficient mechanism to note the feelings, suggestions and ideas of the farmers. The participatory discussions during these feedback sessions where suggestions and ideas were incorporated for the following Action to be undertaken – due to the good rapport established with the research participants, could be seen as the foundation of the successful establishment of the telecentre at Thabina.

The above Section evaluated the success of the application of the various data collection methods used during the four-phase participatory process. The next Section will evaluate the involvement of the role-players during the participatory project.

- **Involvement of the role-players**

Through the bottom-up approach, as promoted by PM&E, followed and with participatory communication, the research participants, with the Management Committee as their spokes-person, felt involved in the whole project. Throughout the study it was clear that all farmers, as well as the Management Committee, gave their full co-operation – whether it was in the completion of interview schedules and the questionnaires on the usage of information and communication technologies, the training, in-depth interviews or discussions. It was clear that the role-players also felt included in the whole establishment and evaluation process, as they often expressed their appreciation for involving them in the decision-making processes as well as with the feedback sessions where field-notes were discussed with them in a participatory manner.

Discussing and evaluating the involvement of the role-players, leads to the next aspect, being the analysis of the data gathered which will be evaluated in the next Section.

- **Analyses of data gathered by means of discussions and participatory observations**

The reason why this participatory approach was chosen for this study was that the research information entailed mainly holistic views seen mainly from the research participants' point of interpretation, as advocated by PM&E (Schenk & Grobler, 2009) analysed by the researcher as participant observer (Cano, 2007): Analyses were done of all discussions regarding the opinions, interpretation and attitudes of the farmers during participatory observation and discussed during feedback sessions (De Vos *et al.,* 1991; World Bank, 2012). Flick (1998) mentions that regardless of the methods used for collecting information, whether they be interviews or direct in the field observation, this

raw data are then transformed into texts by recording and transcription. "Interpretation by whom, about whom, with whom, for whom and why, are basic ethical questions in development cooperation" (Mikkelsen, 1995:87). The opinions, suggestions and questions of the farmers were noted during participatory observations. These field-notes were analysed, discussed and interpreted during the participatory discussions (Gomez *et al.* 2001a; IDRC, 2007a; Coady International Institute, 2014) of the feedback sessions. These notes were discussed with the research participants and incorporated in every document compiled as well as with the discussions on the next Action to be undertaken. It could be said in conclusion (Mulky, 1991) that the success of the telecentre was partly due to the fact that, because the opinions were incorporated, the research participants felt that they owned the telecentre: They looked after the information and communication technologies and managed the telecentre very well.

Transcription of the data collected, whether tacit knowledge from the farmers; verbally obtained information; or non-verbally obtained information, was successfully accomplished by the researcher with the acknowledgement of the role-players at the Thabina WUA, with the recommendations, questions and suggestions in inverted commas through-out the study. This supports Flick's (1998:11) statement that "Interpretative research is concerned with … constructions of reality – its own constructions and in particular those constructions it meets in the field in the people it studies".

This Section described how and why the participatory method was chosen for the study – the positive outcomes, results and conclusions drawn during the process were due to the bottom-up, participatory methodology followed for the establishment and evaluation of the telecentre.

In this Section the methodology of the four-phase participatory process followed for the establishment and evaluation of an agricultural telecentre at the Thabina irrigation scheme was evaluated by means of the PM&E, as recommended by various researchers and theorists (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b). This leads to note that there are criteria suggested and recommended by various researchers and theorists according to which a telecentre should be evaluated. The next Section will evaluate the telecentre according to these criteria.

8.4.4 EVALUATION OF THE TELECENTRE

With the methodology followed for the establishment of a telecentre evaluated as being successful, the telecentre, established and evaluated according to this methodology as such, could now be evaluated. This evaluation is undertaken below – against the criteria derived from suggestions and recommendations by various researchers and theorists (Berg, 1995; Mikkelsen, 1998; Colle, 2006; Fundacion Chasquinet, 2006; Stoll, 2006; Gomez *et al.* 2001a; IDRC, 2007b; McConnell, 2007; UNESCO, 2007; Coady International Institute, 2014) that encourage the PM&E Method.

8.4.4.1 Criteria for evaluating a telecentre

This Section will discuss and evaluate the success of the various aspects regarding the telecentre as recommended by the theorists and researchers as presented below.

- *The stakeholders' viewpoints and needs are important* – various theorists like Mikkelsen (1998) and Berg (1995) conclude, in agreement with PM&E, that the stakeholders should be involved from the beginning of the development project. It is critical that the information needs of these various stakeholders guide the evaluation (IDRC, 2007e). Not only were the agriculture-related information needs of the farmers concluded and identified from needs expressed by the farmers in a prior study, but also their socio-economic and ICT needs as expressed during an assessment with an interview schedule. The outcome of these needs assessments was discussed in a participatory manner in collaboration with the Management Committee. The viewpoints of the research participants were noted in field-notes (Du Plooy, 1995; Berg, 1998; De Vos *et al.,* 2001) which were discussed with the Management Committee to ensure viability and exclude bias. These Actions were constructive and successful, as appropriate information and communication technologies which could address both these sets of needs were identified and purchased by the Management Committee. The telecentre was evaluated positively according to the appreciation the Management Committee expressed for their being involved in all decisions made regarding the compilation of documents as well as to the optimal usage of the information and communicate technologies bought. This participatory research approach undertaken for this study is described in detail in 4.2.4 in Chapter 4.

It could be disclosed then that telecentres are better managed where the owners have a stake in them. Earlier it was mentioned that the farmers of Thabina requested the establishment of a 'telematic centre' long before the establishment of the telecentre. Although the computer and the multifunctional printer were purchased with donations, both these information and communication technologies were well looked after. The fact that 100% of the sample drawn attended to complete the interview schedule on demographic and social needs, showed that the farmers, as stakeholders, felt involved in the establishment of a telecentre. Throughout the study not only the Management Committee, but also the farmers expressed their appreciation for the research undertaken that ultimately led to the establishment of the telecentre, which could be seen that the stakeholders' viewpoints and needs were seen as important and therefore successfully included in all decisions made.

- *The stakeholders should be involved* – the evaluation should be as participatory and locally based as possible and should involve research on the management of the telecentre and its staff, as role-players in the project (IDRC, 2007e). The opinions, suggestions and remarks (Pant, 2012) of the research participants were carefully noted during the structured interviews which led to the successful identification of the socio-economic and ICT needs of the farmers. The Management Committee also appreciated the facts that all draft documents, such as the Business Plan, etc., were discussed in detail with them, and that their suggestions and remarks were included in the final documents which proved to be practical and useful. The evaluation process thus included the views, suggestions and questions of the farmers, the Management Committee as well as the secretary.

As the study was undertaken in a small-scale farming community, the communication systems were taken into account. The indigenous communication system of the developing community is oral and therefore feedback sessions and structured interviews were held with interpreters, in order for the farmers to comprehend the interview schedule. This was also seen as good practice, as the study was based on a bottom-up approach where ideas were exchanged, questions were answered and suggestions were made by the research participants during conversations, as instructed by the PM&E. These were noted and again successfully checked with the Management Committee after the meetings in order to plan the next Action.

- *Methodology of the establishment of the telecentre* – was the methodology applicable? (Gomez *et al.* 2001b). The methodology applied for the establishment of the telecentre in this study was based on the participatory paradigm, selected from the Ethnographic Approach and fully evaluated in Section 8.3 above. In short it could be said that the reason for its success is not only the identification of the agriculture-related information needs, but that the socio-economic and ICT needs of the research participants were also researched, analysed and addressed according to the participatory approach. According to these two sets of needs, the appropriate information and communication technologies were identified and purchased.

The generic four-phase participatory process developed by the researcher was used as a basis for the establishment and evaluation of the telecentre. Adapted for these (mostly) illiterate farmers into a four-phase participatory process for the establishment and evaluation of a telecentre at the Thabina small-scale irrigation scheme, it proved to be applicable and successful, especially with the defined consecutive Phases that were followed, each with its formative evaluation at the conclusion thereof.

The participatory research methodology proved to be successful as all participants felt included in the participatory process and took part in all discussions, resolutions and conclusions – which led to the ultimate goal: The establishment and evaluation of a telecentre at their irrigation scheme.

- *Management* – is the telecentre well-managed? (Gomez *et al.* 2001b). The telecentre seemed well-managed, as the secretary was able to assist all users, from the eldest farmers to the youngsters. The secretary, a qualified school teacher, was capable as well as competent to adapt the high-tech information received from the computer and library into understandable content in the local language. She could also complete the two tables on the usage of the information and communication technologies (2006 and 2007). This means that the infostructure was applicable to the research participants – they understood the messages because they had a secretary at the telecentre who translated the messages from the information and communication technologies into their own indigenous languages. She also successfully compiled various management as well as financial documents to

be submitted to the Management Committee as well as agriculture-related documents to be submitted on a regular basis to the DWA.

- *Training* – is identified as one of the most important factors for the success of a telecentre (Gomez *et al.* 2001b; IDRC, 2007e). The training provided in this project was appropriate and successful, because the financial system could be computerised, which enabled the Management Committee to identify their critical financial position. The software and programs used for training in the usage of the information and communication technologies were discussed in detail previously. The training was successful to the extent that the trainees could, for the first time, have insight in their financial system and realised their financial dilemma. This led to urgent, collaborative conversations with the DWA, as well as DAFF, which would lead to the establishment of the RESIS programme in 2007 in order to alleviate the water scarcity and many farming-related problems experienced. The telecentre was evaluated according to the extent of computerising the financial system by the secretary after her training. This was done through participatory observation (theorists as explained above) while checking the accounts. After her training sessions, the secretary was also able to type documents such as memo's, Agendas and Minutes for the Management meetings. As well as other documents such as assignments and CVs for learners. The training seemed to be appropriate and successful as the main improvement was that the secretary and the Vice-Chairman of the Management Committee could computerise both the management and the financial systems.

- *Opinions of interested parties* (Mikkelsen, 1995; Berg, 1998) – participatory discussions (Gomez *et al.* 2001b; IDRC, 2007e; Coady International Institute, 2014) should be held with interested parties to obtain their opinions in order to incorporate these opinions in all decisions made (Pant, 2012). The fundamentals of this study were the participatory discussions (Gomez *et al.* 2001b; IDRC, 2007e; Coady International Institute, 2014) and observations with field-notes. Through these aspects, the farming needs (NPFA) as discussed in 5.4.1.4 in Chapter 5 as well as the socio-economic and ICT needs as discussed in 6.4.2 in Chapter 6 were identified. Not only was the overt communication noted, but also the covert communication such as facial expressions, hand gestures and body language. This means that the opinions of all farmers were noted and incorporated in managerial documents

compiled and also for the compilation of the interview schedules and questionnaires. These opinions and suggestions were discussed in collaboration with the Management Committee. The establishment and evaluation of the telecentre was participatory and field-notes made during participatory discussions (Gomez *et al.* 2001a; IDRC, 2007e; Coady International Institute, 2014) with farmers and the Management Committee were discussed during feedback sessions with the Management Committee in order to identify whether their opinions, remarks, questions and suggestions had been noted correctly.

Before any technology was purchased, the information needs were determined by analyzing and integrating the agriculture-related information needs with the socio-economic and ICT needs. This provided the criteria for the purchase of the appropriate technology. It could be concluded that the opinions of interested parties were successfully integrated in all decisions made during the four-phase participatory process for the establishment and the evaluation of the telecentre.

Future researchers in the agricultural sector could use the agriculture-related information needs identified in this study as guide-lines for the identification of the needs of farmers in the developing agricultural sector not only in South Africa, but in developing farming communities world-wide.

- *Information received and disseminated* – it is important to note what kind of information is received and disseminated by the telecentre (IDRC, 2007e). Since the secretary hailed from the Thabina community, she understood both the local languages (Tsonga and Sotho) and could translate the messages from the information and communication technologies and the library into the local language for the farmers in order for the farmers to understand the information required by them.

The Thabina telecentre received most information by fax. The information from the Cooperatives (Appendix J) was related to farming practices which included the then current prices of seed for the various crops and fertiliser. From Safex the telecentre received the then current market prices of their various crops. The library received the mouthpiece of the National Department of Agriculture, the *AgriNews* as well as a newspaper, the *NuFarmer* free of charge.

Not only agriculture-related information regarding farming necessities were received by the telecentre, but also information on socio-economic aspects, such as lectures on child nutrition, health and HIV/Aids, and all the children were vaccinated.

This Section evaluated the telecentre as operating successfully according to the various criteria proposed by theorists and researchers. It was found that the Thabina telecentre adheres to the various criteria and measures recommended by theorists and researchers. With the telecentre evaluated as successful, the next step is to evaluate the sustainability of the telecentre according to the various forms and categories of sustainability as suggested by theorists, academics and researchers. This is undertaken in the next Section, Section 8.8.

Having compared and evaluated the Thabina telecentre regarding telecentres found in literature in this Section, the next step is to draw conclusions from the evaluations.

8.5 CONCLUSIONS DRAWN FROM THE EVALUATIONS

Conclusions regarding the evaluations of the telecentre are discussed in this Section. Researchers in this field should take note of these conclusions drawn, as it might be applicable to other small-scale irrigation schemes, especially in a water-resource poor country as South Africa as well as world-wide where applicable. It has never been noted in literature – especially the Section on the environment – but is of cardinal importance with the successful establishment of a telecentre at these small-scale irrigation schemes in particular. Also note the various forms of sustainability, which form the basis of evaluation, but will differ from telecentre to telecentre.

8.5.1 Environment of the telecentre

PM&E emphasises the impact that the environment may have on a project. The negative environment (Mikkelsen, 1995; Berg, 1998) (Appendix A) did not hamper the farmers and they handled all their orders for their farming activities and their communication with agriculture-related organisations such as the ARC, the DWA and the DAFF by means of the telephone and library. During this period they had crops like tomatoes, maize, onions and cauliflower on the land. They ordered these seeds and plants by means of the fax at the telecentre (Appendix J). They also ordered fertiliser fungicides and pesticides by fax. Ward A received water from the canal and Ward B managed to buy diesel for a water pump, but the water was still insufficient and the DAFF was asked for assistance. Although South Africa is a water scarce country

(Kirsten & Van Zyl, 1998; Van Averbeke, 2006) Thabina received good rains in 2007 the canal was also filled with water again to enable the farmers to continue with their farming practices. The farmers rose above their circumstances and made the best of their situation. However, after good rains, the canal filled and all farmers could continue with their farming practices. The telecentre was also secured, and the information and communication technologies were returned.

As a result of the researcher's intensive campaign to make the Management Committee and the community aware of the importance and advantages of communication with the outside world as part of the global society, the community of Thabina utilised the information and communication technologies in such a way that they broke loose from the normal powerlessness of a developing agricultural community which is *au fait* with the power of even the most basic form of technology, namely the telephone.

8.5.2 Feedback sessions with participatory conversations held with role-players involved

The necessity of the participatory conversations and discussions (Gomez *et al.* 2001a; IDRC, 2007c; Coady International Institute, 2014) during feedback sessions (Estrella, 2000; Coryn, 2011; World Bank, 2012) which were held with the farmers as research participants and the Management Committee in order to measure whether they considered the project as successful, is explained below. It could also be seen as vital to communicate with the DAFF and the DWA in order to obtain more information on the circumstances regarding the Governments' involvement. These will also be discussed below.

- A meeting held with the farmers on 12 September 2007 was opened with prayer and 21 farmers attended. The Extension Officer acted as Chairman of the meeting as well as interpreter. During this participatory meeting as promoted by a PM&E (Estrella, 2000; Coryn, 2011; World Bank, 2012) session, the farmers remarked that they used the telephone in the telecentre to obtain "prices of maize and vegetables from the markets", they ordered their "seed, spares for irrigations systems, fertiliser and herbicides from the co-op", they obtained "weather forecasts", they obtained "market prices, trends", and communicate with the market agents, etc. They obtained information on farming practices from the books, manuals, newspapers and journals in the library.

The farmers felt that the telecentre had a huge financial impact on them as they then:

- Obtained knowledge (Bekenstein, 2003; FAO, 2006; McCarthy, 2006; Jones, 2011; Adams & Garbutt, 2013b) that led to better production which increased their income;
- Obtained appropriate information regarding farming practices (Bekenstein, 2003; FAO, 2006; McCarthy, 2006). Through improving their farming practices, the farmers could increase their crop production and the quality of their crops which led to higher income;
- Obtained market-related information that led to them bargaining for higher market-related prices (Bekenstein, 2003; FAO, 2006; McCarthy, 2006). This had a direct impact on influencing their income positively; and
- Sustained fewer losses by getting their produce to the markets intime, which increased the prices which they could acquire for their produce.

The impact on their quality of life (Pant, 2012) was also comprehensive because all their children had been vaccinated and they received several lectures regarding HIV/Aids, child nutrition, health care, schooling, etc.

But most of their problems related to the water situation (Pant, 2012) and the Chairman handed the researcher a letter comprising their difficulties (Appendix P). Farmers had planted tomatoes, onions and beetroot two weeks before this interview but had little water to irrigate. The farmers also had problems regarding the water pumps and diesel that were stolen. They wanted more security from the DAFF in the form of concrete blocks around the pumps with a 'danger' sign to prevent vandalism. The farmers also wanted their boreholes to be checked and revived for continuous farming. The farmers expected the DAFF to train the farmers. The farmers also asked about the RESIS Programme of the DAFF. They had been promised to be included, but nothing came of it. Irrigation schemes of the former homelands had fallen into disrepair due to a lack of maintenance during the 1990's and early 2000's, and urgently needed to be refurbished. The Limpopo DAFF had embarked on a project to refurbish 127 out of 171 of these irrigation schemes. This was called the RESIS Programme (Appendix O). The acronym RESIS Programme means 'Revitalisation of small-scale irrigation schemes' in the Limpopo Province and was initiated in 2002 for the Limpopo Province, but Thabina had

been promised R5 million for the revitalisation of their irrigation scheme by 2007 and would reap the benefits (hopefully) in future.

The conclusions of the researcher's collaboration with the Management Committee were that the farmers felt that the telecentre really assisted and supported them in their farming. Inputs needed from government were also important. Not only through participatory conversations (De Vos *et al.,* 2001; Gomez & Ospina, 2002; IDRC, 2007c) but also from their body language and facial expressions it seemed that although they could continue with their farming, they really had had enough of all the unfulfilled promises made to them by government.

- The feedback session as promoted by PM&E (Feuerstein, 1986) held with the Management Committee on 13 September 2007 was opened with prayer by the Chairman of the WUA who also acted as Chairman of the meeting. During this feedback session (Estrella, 2000; Coryn, 2011; World Bank, 2012) the Management Committee assured the researcher that "the telecentre had paid very good dividends" and that its "input was of great value" and they agreed with the views of the farmers regarding the impact of the telecentre on their lives. The Thabina community, the surrounding communities and the schools and technikon used the telecentre for communicating, typing, copying, printing and faxing. The Management Committee used it for their computerised financial system and to type their documents such as Agendas, Minutes and letters to the farmers. As they were farmers themselves, they agreed on the information which the farmers gave on the telecentre and on the uses of the telephone. Various agriculture-related problems were also discussed and are presented in Appendix A.

  Derivations by the researcher from these participatory (Gomez & Ospina, 2002; IDRC, 2007c; Coady International Institute, 2014) discussions were much the same as those made with the conversations with the farmers. The members of the Management Committee were all farmers and their problems and frustrations were the same as those of the other farmers.

- The researcher undertook to have a feedback discussion (Estrella, 2000; Coryn, 2011; World Bank, 2012) with the Limpopo DAFF (LDAFF) on behalf of the Management Committee in order to discuss the problems that occurred at the Thabina WUA. A meeting was held with an Official from LDAFF on 13 September 2007. A printout of the letter of the Chairman of the WUA was faxed

to her since she had promised by telephone to look into the matter. She was asked for only two pumps to water the crops that were on the field at that stage. But she refused, with the excuse that "the DAFF could not supply any more pumps". The reason was that the pumps got stolen and that the DAFF had not budgeted for additional pumps. Measures that could be taken in future to prevent or at least limit theft, damage or sabotage were the erection of strong pump houses with reinforced concrete walls and roofs and solid steel doors that could not easily be broken into. The Official promised, though, that the "Thabina WUA was first on the list of the RESIS Programme" but couldn't give a date when it would be implemented, as the RESIS Programme was still in the development stage. It should be noted again that this RESIS Programme originated in 2002 and has still not been implemented.

The researcher's conclusions were that the Limpopo DAFF could have helped these farmers a long time ago – it seems as if they were not unwilling, but that funding was a problem. But she had made promises, and if kept, the future of the irrigation scheme looked promising. The farmers have had so many meetings regarding their circumstances and so many promises had been made to them, that the researcher expected relief as promised to them, any time. Although nothing had happened thus far, the researcher believed, after her discussions with the DAFF, that something would come of these promises.

- Feedback (theorists as explained above) was also presented to the DWA: A meeting was held with an Official from the DWA on 17 September 2007. An e-mail was received from him on 9 September 2007. The Official confirmed what he had written in the e-mail which covered the following: He visited Thabina on 27 August 2007 on a fact-finding mission. He confirmed that "assurances of water supply were the main problem". He confirmed that the "lack of infrastructure is hampering farming activities", the "pump station that drew water directly from the Thabina River is vandalised" and the farmers requested the DWA to assist with the "conversion of a canal to a pipeline system in the portion of the canal that passes through the community to avoid pollution". He also confirmed the necessity of including Thabina in the RESIS Programme and said that the DWA was still studying a number of feasibility and research reports done

on the scheme in order to determine homogeneity on challenges and recommendations made by various researchers.

The researcher concluded from this conversation that although the DWA wanted to help, a lack of capacity prevented them from doing so. The DWA was, though, eager to help and assured the researcher that they would keep her informed as soon as they could help.

In this Sub-section the opinions of the role-players obtained by means of feedback sessions (World Bank, 2012) with the researcher, were discussed. The aim was to inform the role-players of the situation of Thabina, the successes gained and the impact of the telecentre. These conversations were also held in order to obtain the opinions of the role-players such as the government regarding their promises, including the RESIS Programme, to the Thabina WUA. Should these promises be kept, it would play a major role in the economic sustainability of the telecentre. With these valuable and encouraging promises obtained from the role-players, the farmers felt optimistic and the future of the Thabina irrigation scheme looked bright and positive. There were also various ways by means of which the Thabina telecentre could receive and disseminate information. These means, including through visitors, are discussed and evaluated in the next Sub-section.

8.5.3 Information received and disseminated

Organisations such as the ARC could be contacted by telephone regarding information on irrigation, renewable energy, farm structures and mechanisation. As mentioned above, seeds, fertiliser, pesticides, etc. could be ordered from the local cooperative. Although it was not as convenient as written orders submitted by fax, the main aim of the farmers was that these inputs could be ordered. From the DWA the telecentre received information regarding the WUA such as administrative correspondence and management information. According to the NWA, the WUA was obliged to perform certain functions such as executing their Water Management Plan which entails the efficient distribution of water on the irrigation scheme; the curtailment of losses from canals and farm dams; and the WUA was obliged to submit progressive reports on the improvement of their water use efficiency on the scheme. The farmers needed to report to the DWA regarding these aspects at certain intervals. The election of new

Management Committees from time to time according to the constitution of the specific WUA had to be communicated punctually to the DWA. DWA was for instance informed by the Management Committee that the irrigation scheme was not functioning, due to water scarcity, lack of diesel and electricity for the pumps, and a lack of pumps to pump water from the canal (Appendix P). Most of these arrangements with DWA could be discussed and explained by telephone.

The community also made use of the telephone for their private and household conversations and it proved that, relating to information received and disseminated via telephone and fax, the telecentre still had an important role to play in the farming community of Thabina.

It seemed as if information received and disseminated by the telecentre was of cardinal importance for the survival of the irrigation scheme. Apart from conversations regarding their socio-economic and personal needs, the farmers had to disseminate important information as dictated by the NWA, to the DWA, which indicated the ICT needs. They also had to disseminate information regarding their circumstances to the then DoA, which they did by telephone and fax.

Compared to the three other irrigation schemes (Limpopo Province, Free State Province and Mpumalanga Province) the telecentre was seen as the most successful telecentre in the developing agricultural sector, especially as it was located at the first small-scale WUA in South Africa. It is therefore important to note that several dignitaries visited the telecentre. In the next Section the visitors that regarded the telecentre as important enough to visit, are discussed.

8.5.4 Visitors to the telecentre

Except for the community and farmers who regularly visited the telecentre, there were other visitors from government as well as from overseas.

- **Ms. Felicity Chancellor**, an irrigation development expert from the UK, heard about the telecentre and wanted to learn first-hand about the possibilities of a telecentre in a farming developing community in South Africa. She visited the telecentre in 2003. Ms. Chancellor is a British national with graduate and post-graduate qualifications in economics, psychology, and agricultural economics. Over the last fifteen years the majority of her research has been under contract to DFID as part of the Knowledge and

Research Programme. She has contributed to the body of knowledge on the socio-economic and ICT parameters that are important to the sustainable use of irrigation as part of a livelihood strategy that contributes to poverty alleviation in rural and peri-urban environments (Mikkelsen, 1995; Berg, 1998) in developing countries.

- During the Water Week organised by the DWA in March 2003, the **Minister of Water Affairs and Forestry** visited the telecentre. As the Thabina WUA was the first WUA to be established by small-scale farmers of the developing agricultural sector in South Africa, the DWA arranged that the opening day which formed the highlight of the National Water Week, was held in Lenyenye, the closest town to Thabina, in order to celebrate the new WUA and its new telecentre – a first in the developing agricultural sector in South Africa. This was held on 17 March 2003, with senior officials, including the MEC of the Limpopo DAFF and delegates, *inter alia,* from the UK, visiting the telecentre and the WUA. The MEC and officials visited the telecentre, and were highly impressed about such a venture 'out in the bush'. The MEC also visited the telecentre and in his presentation he concluded with positive and optimistic comments and statements about the ability of obtaining information as well as information dissemination that has now been acquired by the Thabina WUA by means of the telecentre.
- During July 2002 the President of the Hungarian Telecentre Organisation, **Matyas Gaspar** and his delegation visited the Thabina WUA. On arrival the Hungarian delegation was warmly welcomed by the Chairman, Vice-Chairman and the Treasurer of the Management Committee. The delegation was highly impressed by the telecentre in a rural African community, being to them, a new application to the concept. In the relaxed atmosphere valuable conversations took place and ideas were exchanged, problems discussed and solutions offered. The Management Committee was also informed by Mr Gaspar during a presentation concerning the current situation in Hungary, regarding their telecentre movement which was financially supported by government. The delegation was much surprised to learn about the financial aspects of the Thabina telecentre – how it could be established and maintained with minimal assistance from government and none from NGO's. The delegation also visited

some of the plots. They expressed their sincere appreciation to the Management Committee for a highly informative and enjoyable day.

8.6 CONCLUSIONS

Conclusions drawn from the evaluations showed that the telecentre is successful, as participatory conversations were held with various delegates with positive outcomes, of which the promise of the RESIS Programme is the most important and the telecentre was visited by various spokespersons regarding telecentres, including from abroad.

Apart from the various national and international visitors the telecentre received, there were also other means by which the word regarding the new telecentre at Thabina was spread. These means and the various reactions are discussed and evaluated in the next Section.

8.7 SPREADING THE WORD

Independently from the local visitors and those from abroad, word has also spread to other organisations, and the following are examples of their reactions.

- Agricultural engineering service providers have been appointed by the Limpopo DAFF to undertake the necessary planning and technical research of the canal systems and farmer management systems for each irrigation scheme. News of the successful telecentre at Thabina has also spread to other irrigation schemes by means of these engineers. Support and training were rendered at the Tswelopele and the New Forest irrigation schemes during 2003. The same training was presented to these farmers as the training provided to the secretary and the Vice-Chairman of the Management Committee at Thabina telecentre. A second telecentre was established successfully in the Free State Province at the Oppermansgronde WUA. This telecentre was established according to this four phase participatory process, which proved to be highly applicable. The participatory process could be applied, with little adaptations to this Afrikaans speaking community.
- News about this telecentre has also spread to the Department of Agriculture, and an instruction form was received from the Director General of the DAFF in 2001 (Appendix D) to propose that a project of this great impact should be financed by them. These funds could be valuable to the telecentre, as very little funds were

obtained from the DAFF, except for the building in which the telecentre was situated. Unfortunately the official had resigned and nothing came of it.

- *Agricultural News,* mouthpiece of the Department of Agriculture published an article in August 2001. The article referred to the establishment of the Thabina telecentre. The article explained the concept and the establishment of the Thabina telecentre, with follow-up articles on visitors to the telecentre as well as on the various information and communication technologies and its assistance to the community. There was also an article on the visit of the Hungarian delegation led by Mr Matyas Gaspar. Mr Gaspar was the then President of the Hungarian Telecottage Movement, and these Hungarians were much surprised to find a telecentre in such a rural South African WUA.
- In December 2007 a refereed article titled 'A case study of a successful rural agricultural telecentre at Thabina in the Limpopo Province of South Africa' featured in the international *Journal of Development Communication*. This article was compiled by the researcher in collaboration with two professors at the University of Pretoria. Various articles featured the four-phase participatory process and explained the concept of a telecentre in the rural WUA in South Africa. International visitors to the telecentre were also covered by *DAFFNews* (Appendix R).
- The producers of the 'Mopani' programme on SABC television read about the Thabina telecentre and as they broadcast in the Limpopo Province, where the Thabina telecentre is situated, the broadcaster was keenly interested in the concept of a telecentre in a rural agricultural community in their province. A video was filmed and was broadcast on 21 May 2003.
- Other articles were published in the *DAFFNews* and *NuFarmer*, aimed at the upcoming developing farmer. These articles covered the fact that the Thabina telecentre was the first telecentre at a small-scale irrigation scheme, the training that was given to the secretary and the Vice-Chairman of the Management Committee.
- Several presentations were also held regarding the Thabina telecentre – two at the University of Pretoria, several at the Institute for Agricultural Engineering, two at the Agricultural Research Council Central Office, and one at the New Forest

irrigation scheme, one at the Oppermansgronde telecentre and one at the Tswelopele irrigation scheme.

- The telecentre expanded its services to the surrounding schools and technikons, and could increase the income by means of the learners using the information and communication technologies. This was due to the researcher who had, in collaboration with the Management Committee, compiled a brochure in the form of a z-folder (Appendix I) and distributed it to the surrounding schools and technikons. This seemed a good practice because many students contacted the telecentre for the typing of assignments, CVs, etc. as well as copying and printing of documents. Good income was generated from this, which supported the financial sustainability of the telecentre.
- The Thabina telecentre in itself, despite the negative and harsh environmental factors against which the PM&E warns researchers (Mikkelsen, 1995; Berg, 1998), was such a success, that the Agricultural Research Council decided that more telecentres should be established. In 2006 a project was registered under the Sustainable Rural Livelihoods section to establish a telecentre at the Oppermansgronde irrigation scheme in the Free State Province. This telecentre was successfully established according to the four-phase participatory process, which was adapted by the researcher for these farmers, and was translated into Afrikaans. Training was also given to the users. Through this telecentre the irrigation farmers could computerise their management as well as their financial systems. Eleven institutions – including both the schools, the Post Office, the municipality – in the community of Oppermansgronde bought into the telecentre and made a combined effort to carry the cost for the Internet and e-mail.

This Section discussed how the word regarding the Thabina telecentre was spread nationally and internationally. This telecentre was now known nationally and internationally and various persons from abroad were fascinated with this “telecentre in the bush” as Mr Matyas Gaspar from Hungary described the telecentre in Thabina.

With such a comprehensive initiative established and evaluated, there are conclusions to be drawn on the success and the effectiveness of the telecentre. In the next Section these conclusions are drawn regarding the success and effectiveness of this telecentre**.**

8.8 CONCLUSION: SUCCESS AND EFFECTIVENESS OF THE TELECENTRE

With the telecentre recognised and acknowledged locally and abroad, its success and effectiveness could be evaluated. The telecentre was fully functioning and the technologies were optimally used. Changes or improvements that should be made, though, would include the increasing of the time in the afternoons for the usage of the information and communication technologies. This benefitted the learners which are in school in the mornings as well as the farmers who irrigate in the mornings. This led to a large percentage of the users gathering in the afternoons.

The generic four-phase participatory process formulated by the researcher could be applied to similar projects, whether it is the establishment of an institution, a Cooperative, a Trust or any Community Development Programme. The research monitoring during each Phase as advocated by the PM&E and applied in this study, supported the formative evaluation at the end of each Phase. As planned, this participatory strategy and work-plan were successfully implemented and presented a structure where each Phase could be evaluated before the next Phase was undertaken. This means that the goals of this project could be validated.

Expected outputs of the project have been produced, which could be reached with the participation, considerations and suggestions by the research participants as recommended by PM&E. This led to the establishment of a telecentre which the farmers at Thabina, as the research participants, incorporated and grasped as their own – which is in line with Heeks (2004:18) expressing that “the poor will only reap the fullest benefits of technology when they own and control both technology and its related know-how”. The farming community of Thabina took ownership of the telecentre as all their information needs were addressed because their suggestions, ideas and opinions had been incorporated in all Actions taken. The Management Committee also took ownership of the telecentre because the establishment of the telecentre included the training of the Vice-Chairman and secretary in the usage of the information and communication technologies offered by their telecentre, as suggested by Benjamin (2006).

The use and availability of the information and communication technologies (infrastructure) led to the computerising of the management system as well as the financial system of the telecentre, which was formerly done manually, causing erroneous conclusions and consequences for the Management. This also led to the identification and remediation of problematic aspects such as the financial implications that could be

identified by means of the financial system which was systemised and implemented on the computer. This lead to the Management Committee conversing with the DWA regarding their poor financial position, as explained earlier (Appendix P).

The benefits of the project were that an extensive contribution was made regarding information (infostructure) which was obtained (Bekenstein, 2003; FAO, 2006; McCarthy, 2006) regarding the farming practices for the farmers; management and financial information for the Management Committee; information for assignments to the surrounding learners and students; and information regarding socio-economic and ICT aspects for the surrounding villages as explained in Chapter 2.

There was enough evidence, although the lack of water hampered the farmers, that the existence and utilisation of the telecentre had opened up a number of avenues to the farmers in order to become independent and take care of their own future, as encouraged by PM&E. Since the Thabina irrigation scheme had many similarities with other resource poor irrigation schemes, especially in the former homelands of South Africa, in terms of lack of capital, available information, agricultural skills as well as know-how and support from the service sector, the lessons learnt here could be applied throughout South Africa to small-scale irrigation schemes in the developing irrigation sector. These lessons have already been applied to other irrigation schemes such as the Oppermansgronde irrigation scheme in the Free State Province, Tswelopele irrigation scheme in the Mpumalanga and the New Forest irrigation scheme in the Limpopo Province.

This Chapter explained that the establishment of the telecentre at Thabina was successful and that this methodology could be applied by other researchers in the field of establishing telecentres in the developing agricultural sector of South Africa. The generic four-phase participatory process could also be used as blue-print for researchers in countries where the agriculture-related information needs of the farmers are more or less the same as those of South Africa's developing agricultural sector. This Generic Four-phase Participatory Process can be adapted for the establishment of a telecentre, nationally and internationally, the establishment of a Cooperation, a Trust or a Community Development Programme.

In this Section the conclusions were drawn on the success and effectiveness of the telecentre. In the next Section, the summary of the chapter is presented.

8.9 SUMMARY

In this Chapter which formed Phase 4, the Evaluation Phase of the four-phase participatory process, the four-phase participatory process was evaluated – each Phase according the various Actions executed during each specific Phase which led to the PM&E of this methodology according to which this four-phase participatory process was designed, created, implemented and evaluated. The evaluation of the application of PM&E according to the aspects promoted by the PM&E Method resulted in the telecentre being evaluated according to criteria as encouraged by researchers and theorists. These evaluations were followed by the PM&E regarding the various forms of sustainability as prescribed by several theorists and researchers. Additional national and international telecentres were researched in Chapter 3 in Sub-section 3.5.5 and the establishment, funding and running of the Thabina telecentre was compared to that of these telecentres researched. The conclusions drawn by the researcher were followed by a Section regarding the spreading of the word: This Section was presented for interest's sake of the reader regarding how the word of the establishment and evaluation of the Thabina telecentre was spread nationally and internationally. The successes and effectiveness of the Thabina telecentre were explained in the Conclusions Section.

Section 1 presented an Introduction to the Chapter. Section 8.2 presented a background on how phase 4 would proceed. Section 8.3 presented a time-line for the Actions for Phase 4 and evaluation thereof; Section 8.4 described the Actions undertaken during the Phase and Section 8.4.1 systematically and formatively evaluated the Actions of the Four-phase Participatory Process according to the PM&E Method (Feuerstein, 1986; Berg, 1998; Estrella, 2000; De Vos *et al.*, 2001; Coryn, 2011; World Bank, 2012; FAO, 2013; Adams & Garbutt, 2013b) with Section 8.4.2 evaluating the application of PM&E. PM&E used for telecentres in this evaluation phase is explained is Section 8.4.2.1 and Section 8.4.2.2 evaluated the methodology. Section 8.4.2.3 followed with the PM&E evaluation (theorists as explained above) of the telecentre which was established according to this Four-phase Participatory Process. Section 8.4.3 drew conclusions in collaboration with the Management Committee regarding the environment of the telecentre; the various feedback sessions; and information received and disseminated by the telecentre with sub-sections 8.4.3.1 to 8.4.3.4 explaining the environment, the feedback sessions, the information received and disseminated and the visitors to the telecentre. Conclusions were drawn in Section 8.5. Section 8.6 explored

how the word regarding the new telecentre at Thabina was spread, followed by Section 8.7 which presented the Conclusions drawn on the success and effectiveness of the telecentre. Section 8.8 rendered the Summary of the Chapter.

In the next Chapter, Chapter 9, the conclusions and recommendations regarding the project are discussed and explained. The first question to be raised in a comprehensive project such as this establishment and evaluation of a agricultural telecentre, would be whether the research objectives were addressed. After a comprehensive discussion on the research objectives other aspects to be dealt with will include the identification of good practice identified through PM&E, recommendations for future research and whether the data collected, gathered and applied through this study was reliable and valid.

CHAPTER 9 – FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

9.1 INTRODUCTION

Chapters 5 - 8 described the progress and evolution of the establishment and the evaluation of the agricultural telecentre at Thabina, according to the four-phase participatory process, as adapted to Thabina from the generic four-phase participatory process created in Chapter 4. Each Action undertaken was described and also evaluated according to PM&E. In the previous Chapter, Chapter 8, which was the evaluation Chapter, each of these Actions, as well as the four-phase participatory process was evaluated successfully according to PM&E. Consequently it can be deducted that the application of the PM&E method was successful.

Since the characteristics and aspects of the four-phase participatory process were evaluated by means of the PM&E method in the previous Chapter, this Chapter will evaluate the study – the research objectives and the success of the study in reaching these objectives. Good practice identified through PM&E as well as aspects to take into consideration with the establishment of a telecentre at a rural irrigation scheme in South Africa are identified and recommendations for future research in the establishment of a telecentre at a small-scale irrigation scheme in South Africa will be presented.

Section 9.2 explores the achievements reached through the four-phase participatory process with Sub-section 9.2.1 regarding the information and communication technologies and Sub-section 9.2.2 regarding the context of the telecentre. Section 9.3 explains good practice identified through PM&E with discussions on the environment (Sub-section 9.3.1) and time-related issues (Sub-section 9.3.2). Section 9.4 considers recommendations based on PM&E with Section 9.5 explaining PM&E regarding closing reflections on the evaluation process. Section 9.6 presents an evaluation of addressing the research objectives and the Chapter concludes with a Summary in Section 9.7.

This Introduction described the layout of this Chapter and the various aspects to be addressed. In the following Section, the application of the advantages of the Ethnographic approach, as well as the expertise gained and the successes achieved during the four-phase participatory process for the establishment and evaluation of the Thabina telecentre, are explained.

9.2 ACHIEVEMENTS REACHED THROUGH THE FOUR-PHASE PARTICIPATORY PROCESS

Since this study comprised the establishment and evaluation of a rural agricultural telecentre which is based on information and communication technologies, the impact of the information and communicate technologies on the development of the Thabina community will be discussed first.

9.2.1 INFORMATION AND COMMUNICATION TECHNOLOGIES

This Section discusses the achievements reached through the information and communication technologies.

9.2.1.1 Successful applications executed and accomplished by means of the information and communication technologies

The secretary and the Vice-Chairman of the Management Committee were both trained in the use of the information and communication technologies, as recommended by PM&E. They have defined the various applications of these technologies, as recommended in Chapter 2 in Sub-section 2.2.1: They have not only applied the technologies for creating, copying and printing documents in MSWord, but have also gained the expertise to computerise their managerial and financial systems in MSExcel. This was one of the most important achievements of the project, as the poor financial management of the irrigation scheme was identified as a need to be addressed. The Management Committee immediately took pro-active actions in the form of a letter submitted to DWA (Appendix P), which led to the DWA investigating their problems and a promised implementation of the RESIS Programme (Appendix O) – the information and communication technologies thus played a pivotal role in the development and survival of the Thabina irrigation scheme, as indicated in Chapter 2 in Sub-section 2.3.1.1.

9.2.1.2 Obtaining funds for the acquisition of information and communication technologies

To obtain sufficient funds in order to purchase the appropriate information and communication technologies as requested by PM&E, posed a challenge for the rural agricultural community of Thabina. In Chapter 2, in Sub-section 2.3.1.4 it is explained that donor funding is mostly a once-off grant. This unfortunate situation was applicable to Thabina, as government paid only a portion of the travelling costs and

accommodation of the researcher but no funding for the running and management of the telecentre. But this situation did not hamper the Management Committee in their efforts to obtain the technologies: A critical contribution to the project was the determination by the Management committee to succeed in acquiring the information and communication technologies; they immediately took action by requesting the researcher to find donor funds (Chapter 7, Sub-section 7.4.1). This paid off well, and the information and communication technologies (a computer and a multifunctional printer) were bought with donor funds obtained from various institutions locally and internationally.

9.2.1.3 Addressing Action Lines of the WSIS successfully throughout the four-phase participatory process

An essential contribution to a project with small-scale farmers is to incorporate their indigenous culture in the project, as promoted by PM&E. During this project, the Action Line C8 of the WSIS (Chapter 2, Sub-section 2.4.2.2) regarding the cultural heritage of the developing community was also addressed throughout the four-phase participatory process. The secretary, being fluent in both the indigenous languages, could translate and explain the information obtained from the information and communication technologies, including the library, to the farmers. Chapter 3, Sub-section 3.3.4 also reads that intercultural communication is addressed in order for peoples to understand each other in the environment of a telecentre that takes multi-culturalism into consideration and in Sub-section 3.8 the importance of respect for cultural contexts is urged. During the structured interviews (Chapter 6, Sub-section 6.4.2.1) completed in the Phase 2, the Extension Officers translated and explained the questions of the interview schedule to the research participants, not only by means of the sketches which supported the questions, but also, and especially, the open-ended questions of the interview schedule.

The traditional media (Action Line C3, Chapter 2, Sub-section 2.5.1) namely the oral communication system of the Thabina farmers in this remote and marginalized region were successfully accommodated, which led to encouraging rapport and positive, constructive support not only from the Management Committee, but all farmers as research participants. This was achieved by the fact that all conversations – during the various Actions of the four-phase participatory process, during the feedback sessions and during observation with field notes, were undertaken in an interactive, participatory and interpersonal context.

This Section deliberated and considered the various achievements and accomplishments reached regarding the information and communication technologies during the four-phase participatory process of the establishment and evaluation of the rural agricultural telecentre at the Thabina irrigation scheme. The next Section will reflect on the achievements regarding the telecentre as such.

9.2.2 THE TELECENTRE CONTEXT

In the first Sub-section the applicability of the Ethnographic Approach followed for the study, will be discussed.

9.2.2.1 Successful application of the Ethnographic Approach

One of the crucial aspects of the study, namely the Ethnographic Approach that was applied and followed for the establishment and evaluation of the Thabina telecentre, ensured the successful completion of the four-phase participatory process. As promoted by PM&E, the continuous participatory feedback sessions as well as the participatory discussions where all suggestions, comments and questions of the research participants were taken into consideration and integrated with final decisions, played an important role in the success of the project – not only with the good rapport established, but also that this good rapport led to the fact that the farmers gave their full consent for the project, and that they also accepted not only to support the project, but the telecentre as such, based on the information and communication technologies, as their own.

It was found that an important aspect of the PM&E is the feedback sessions which were specifically and purposefully held after each of the Actions. During these feedback sessions the field-notes of the specific Action were discussed, deliberated, and finalised and supplementary suggestions for future Actions to be undertaken were made by the Management Committee. These feedback sessions assisted the researcher to prepare accurate formative PM&E of each Phase. These formative PM&E at the end of each Phase were integrated into the successful summative PM&E results at the end of the four-phase participatory process, which indicated and proved the success of the four-phase participatory process regarding the establishment and evaluation of the Thabina telecentre.

Additional successes that could be highlighted were the advantages and usefulness of the participatory, hands-on discussions of the findings of the various sets of needs:

- With the participatory discussions of the identified agriculture-related needs, presented in table format by the researcher, with the role-players (Chapter 5, Sub-section 5.6) valuable results were obtained such as that all role-players agreed with the NPFA as departure-point for further Actions to be undertaken. This resulted in the fact that not only the acknowledged and accepted agriculture-related information needs of the farmers could be addressed, but also that the applicable information and communication technologies to address the agriculture-related information needs, were identified.
- Participant observation showed that the outcome of the interview schedule (Appendix F) was successfully discussed by means of participatory deliberations and negotiations which led to all questions and uncertainties of the Management Committee were incorporated in the final outcome – the Management Committee was satisfied that the outcome presented was a good indication of the socio-economic and ICT needs of the Thabina farmers. This resulted in the identification of appropriate information and communication technologies to address these needs, as well as various unforeseen socio-economic aspects addressed as explained below.
- The researcher, for instance, submitted only draft documents which were extensively discussed with the Management Committee before they were accepted, such as the Project Plan, the document on how to manage a telecentre, the interview schedule as well as the field-notes that were discussed with the Management Committee. The value of the participatory process also comprises capacity building by offering managerial skills as well skills such as the training of the Manager to run the telecentre, to operate the information and communication technologies and to liaise with the broader community. The Management Committee also attained valuable and essential methods and techniques on how to manage their WUA as an institution.

9.2.2.2 The successful addressing of three categories of needs

One of the outstanding accomplishments of this project was the identification, categorisation and integration of various sets of needs which led to the identification, purchasing and installation of appropriate information and communication technologies to address the agriculture-related information needs, as well as the socio-economic and the ICT needs. The assessments to identify these needs were undertaken in order to

identify the information and communication technologies that could address all these needs of the farmers of the Thabina community. The aim of telecentres, as described in Chapter 3 in Sub-section 3.3.1 is to provide, establish, assist and maintain information and communication in order to address socio-economic needs.

But the telecentre at Thabina not only identified the socio-economic as well as the ICT needs by means of structured interviews (Appendix F) but also the agriculture-related information needs. The identification of the agriculture-related information needs was achieved by means of meticulously categorising preceding research with the various role-players, undertaken at the Thabina irrigation scheme (Appendix C). The successful identification of these three sets of needs led to addressing of not only the socio-economic needs as suggested by theorists and academics, but also both the agriculture-related information needs and the ICT needs. These Actions comprised the outcomes being integrated for the identification of information and communication technologies to address both these sets of needs simultaneously – the farmers needed information but also a communication outlet in order to voice their needs.

These assessments are in line with theory which recommends that a participatory needs assessment of the community should be developed and undertaken in order to promote community empowerment in Chapter 3, Sub-section 3.3.2. Addressing these socio-economic needs led to various supplementary Actions, which were not foreseen with the commencement of the four-phase participatory process. These Actions entailed addressing of unforeseen socio-economic needs (Chapter 7, Sub-section 7.4.2) such as that all the children were vaccinated and lectures on health aspects were presented by the nearby clinic; the marketing of the Thabina telecentre by distributing a brochure on the activities of the Thabina community (Appendix I); purchasing of curtains for the telecentre; creating a logo for the telecentre; painting of the telecentre; purchasing a PA-System for the telecentre; and the establishment of a library in the telecentre.

9.2.2.3 Effective re-packaging of information by the secretary

An important accomplishment of the project was that the secretary, and sometimes with the assistance of the Extension Officer regarding technical farming aspects, translated the information of the documents obtained from the information and communication technologies into the indigenous languages of the farmers, as recommended by theorists in Chapter 3 in Sub-section 3.4.2. These technical documents, written in English, mostly comprised correspondence with government departments such as the

DWA regarding the NWA (reports from Thabina on day-to-day management information on the amount of water used; progress with water conservation management; and management and administration of the WUA – as explained in Chapter 3 in Sub-section 3.5.1) as well as correspondence with NPDALE and other departments and agriculture-related organisations. The secretary had the necessary language skills and could convert the complex information into practical and understandable information in the indigenous language of the farmers, as recommended in Chapter 3.

9.2.2.4 Interview schedules

One of the significant achievements of this study is the completion of the interview schedules by the farmers, where important information could be obtained. The reader should take into consideration that the interview schedule was completed by rural, some illiterate, third world research participants. As explained in Chapter 6, (Sub-section 6.4.3) It must further be remembered that the questions of the interview schedule were discussed and explained by the translators in their indigenous language. Important to take into consideration is that these Extension Officers, as translators, explained the questions according to their own perception and comprehension of the specific question. From the viewpoint of somebody with a very limited education to complete an interview schedule, most of the concepts explained during the structured interviews were without doubt strange and foreign.

The fact that valuable and meaningful answers were obtained from the interview schedule could be seen as a valuable achievement of the study. This led to constructive arrangements made and measures implemented, even those unforeseen and unexpected, as explained in Chapter 7.

9.2.2.5 A telecentre without Internet?

When referring back to the definitions of telecentres in Chapter 3, it is clear that the overwhelming identifying characteristic of a telecentre is that it is a venue that houses different kinds of information and communication technologies. In defining telecentres, no precondition exists for a particular type of technology, and this goes for the Internet, to be present to qualify as a telecentre. The researcher argues that it is more important to prioritise the needs of the community for certain information and communication technologies. As long as one or more technological devices are accessible to a

community which have been defined in the needs assessment of the community, a telecentre is defined.

It would be unnecessary to argue that the full range of information and communication technologies should be installed in a telecentre if not affordable (note the earlier reference from Naidoo about the number of people in Africa who don't even have basic communication infrastructure such as a telephone in Section 1.2 and Sub-section 2.3.1.3). Within the context of the information poor in Africa and other developing nations and developing segments of society around the world, sustainability hinges on affordability and the choices that come with scarcity. Unfortunately, information costs through Internet-linked devices are still too high for communities where a nutritious meal, running water and enabling development infrastructure are still out of reach for millions of the poor. It therefore follows that it is more important to ask what types of technology are needed most in a specific situation and whether it is affordable to the user community in the long term. Although the cell phone, as mentioned in 3.5 in Chapter 3, cannot replace the telecentre, it could be a technology well suited to these circumstances. The needs assessment in the user community should indicate which types of information and communication technologies are needed most and where the cut-off point of affordability lies.

If a telecentre is to serve a developing agricultural community in South Africa, the needs assessment may for instance indicate that the main needs for the telecentre would be a computer with a multifunctional printer and a telephone. In the case of the Thabina WUA, the services the community needs were rather basic and, although the information needs indicated that the Internet could address some of the needs, Internet would be a 'nice-to-have' from this perspective, but which they could not afford at that early stage. The sustainability of a telecentre at these small-scale irrigation schemes depends largely on the ability of the users to pay for the services. It is therefore important to rather be conservative in assessing the economic viability of the types of information and communication technologies to be installed, in terms of both initial cost and operational costs. Because of the fact that a small-scale agricultural community is financially completely dependent on income generated in agriculture – which is at best a high-risk business – leaving the community encumbered with too high an expenditure burden, may just be an early indication of failure for the telecentre. It is thus important to keep the operational costs of the telecentre within affordable limits, as it may happen that the

initial capital investment in the building and the information and communication technologies is funded from outside, but the operational costs are not. The telecentre also generates income from services rendered such as typing, etc.

If the addition of Internet might jeopardise the sustainability of the telecentre, it becomes an aspect that should be managed very carefully, together with the other costs. Since communities at these small-scale irrigation schemes in South Africa are seldom affluent, and often very poor, this point should be kept in mind in identifying the types of information and communication technologies to be used when a specific telecentre is established. In a poor community like Thabina, instead of bombarding them with superfluous high end technology rather than the more entry level equipment, it would be more productive to first concentrate on optimizing the effective use of e.g. the telephone and copier rather than introducing Internet connectivity and thereby jeopardising sustainability.

Internet connectivity may be seen as a nice-to-have by some telecentres, or as a definite needs by some other telecentres. But Internet connectivity is obtained in order to support the addressing of the needs of the farmers. But what would be the needs of these farmers to address? The following Section describes the various needs of a farming community as identified through assessments, and also how these needs should be treated and dealt with to ensure the optimal and successful addressing of these needs.

This Section explained the most important aspects that have been achieved and found during the various Actions undertaken as well as the expertise gained during the four-phase participatory process regarding the telecentre as such. In such a comprehensive study, there are always aspects identified for future research. The next Section will identify and discuss aspects encountered through-out the project which could be seen as good practice for future research in the establishment and evaluation of a rural agricultural telecentre at a small-scale irrigation scheme.

9.3 GOOD PRACTICE IDENTIFIED THROUGH PM&E

Several factors to take into consideration with the establishment of a telecentre at a rural irrigation scheme in South Africa were identified. These important aspects recognised during the course of the evaluation of the study were identified as being important factors in the establishment of a telecentre. As discussed earlier, the environment

played an important role in the changed circumstances of the Thabina irrigation scheme. Therefore the environment will be discussed first.

9.3.1 Environment to be taken into consideration

PM&E promotes that the environment of a project should be taken into consideration. The impact of the environment on the Thabina irrigation scheme was discussed earlier (Appendix A) and one of the most important aspects to take into account is the economic feasibility of the irrigation scheme itself. At the stage when Thabina was selected by the researcher for the establishment of a telecentre, it was together with two other small-scale irrigation schemes in the Limpopo Province, selected by the Limpopo Department of Agriculture for the refurbishment of the infrastructure to a degree where they would be sustainable - independent from continuous financial assistance from government. It was also for that reason that Thabina was selected by the Department of Water Affairs to establish the first WUA for historically disadvantaged individuals in South Africa. The establishment of a telecentre was seen as providing the additional service needed to ensure sustainability.

The Google Earth photograph (below: *Photo 40)* taken in May 2009 of the Thabina irrigation scheme shows the canal that supplied irrigation water to the scheme running from the bottom in a north-easterly direction. It could also be noted that only the south-western (lower left) part of the scheme is nowadays ploughed, and that more than 50% of the former ploughed area is now starting to return to bush again, due to the lack of adequate irrigation water during the last couple of years.

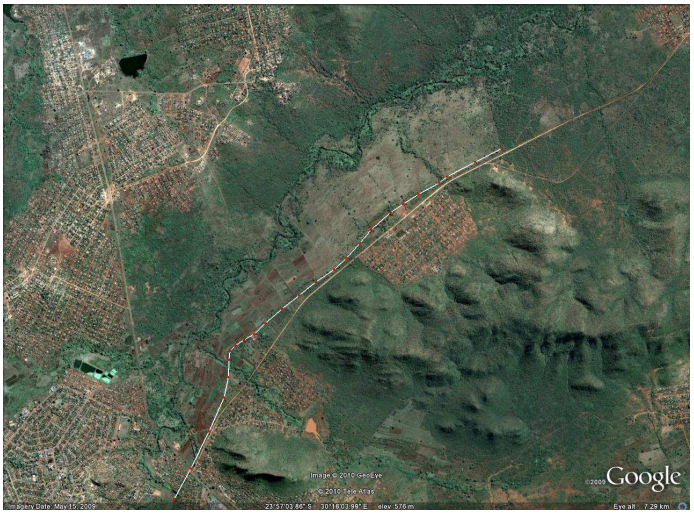


Photo 9.1 - Google Earth photograph taken in May 2009 of the Thabina irrigation scheme

A lesson learnt was that government should undertake proper studies and the outcomes and results should be analysed and decisions made whether or not an irrigation scheme should be rehabilitated. Good soils and the availability of a reliable supply of irrigation water are some of the important aspects government should investigate. This is important, as the farmers will have other environmental factors to cope with, such as drought, as there is water scarcity in South Africa.

Jointly with the experience of a harsh environment, is yet another aspect of what these peoples at these irrigation schemes have to endure. This entails the perception and attitude of these rural farmers towards time as such. These perceptions of time of the rural farmers will be discussed in the next Section.

9.3.2 Time related issues to consider

The participatory discussions, negotiations and considerations as advocated by PM&E during the four-phase participatory process were directed towards a developing agricultural community, whose perception of time is practically the opposite of that of the people from the developed world. A guideline for researchers is that it is typical of a developing agricultural community, especially in rural areas in South Africa, to operate as if they had all the time in the world to execute some task, and for good reason: They are used to standing and waiting for hours in long queues – for water with their water cans, for medication at the local clinic or for food at the local shop. The best practice is to take into consideration the culture of the research participants, as promoted by PM&E: Be prepared never to be in a hurry, or become restless, or agitated. This will immediately be noticed (if perhaps only through body language), as these rural people are very sensitive to the attitudes of others toward them.

The best practice is to make ample, if not extensive, time available for the communications and negotiations, as full participation and involvement takes time. A few incidents regarding time-related issues that influenced the study are mentioned below:

- The first aspect that could be mentioned here was the time allocated to the feedback sessions with the Management Committee. These were arranged to commence at 09:00 on the mornings of the agreed dates. While the researcher made sure to be in time for the meetings, the members of the Management Committee turned up one by

one, chatting and laughing resulting that not one of these meetings started at the appointed time. This could be seriously frustrating to a person from the developed world – but it should be kept in mind that in the developing world, time is definitely not an issue – it is a culture in which time plays a minimal role.

- The second aspect that could be mentioned here was the time consumed by the communication process with the completion of the interview schedule during the structured interviews. The translators had to translate quite a few questions into the other indigenous language, namely Sotho and the sketches also had to be explained which was a time-consuming process (Chapter 6).
- During the demonstration of the information and communication technologies it was also complicated and endlessly time-consuming to explain and demonstrate a concept such as the various information and communication technologies by means of a translator who had to translate sentence by sentence. For him then to take his time to translate each question or sentence or answer into English, also took up much time.

The various aspects regarding good practise as indicated through PM&E regarding the evaluation of the establishment of an agricultural telecentre were discussed in this Section. From this, various recommendations for the successful establishment of such a rural telecentre at a small-scale WUA in South Africa, are concluded. These are discussed in the next Section.

9.4 RECOMMENDATIONS ENCOUNTERED, BASED ON PM&E

This study encompasses the evaluation of the establishment of the first telecentre at a newly established, and first for South Africa, small-scale WUA. With such a comprehensive study where all Actions are evaluated according to PM&E, there are recommendations identified that could be followed by future researchers. These recommendations for future researchers are explained below.

9.4.1 The important role of a telecentre at a small-scale WUA in South Africa

Investigating and carrying out research into the agricultural necessities and resources in order to establish facts and to establish the necessity of interventions such as the establishment of a telecentre, was proven by this study to be of absolute importance. Considering the current situation in the irrigation sector in South Africa, the aim was to

verify new ideas that would contribute to the upliftment of the small-scale irrigation farmers of the Thabina irrigation scheme.

At a small-scale irrigation scheme, it should not be said that when the main source of income of a community is at danger to fail, a telecentre should not be established. The telecentre is one of the support structures to help the community to develop and become successful, and to withhold it from the community is to increase the possibility of their downfall (like a doctor that only treats the patients that he thinks will survive!). But a different strategy may be followed if it is evident that the irrigation scheme has too many handicaps to survive. This means that the eight requirements mentioned in Sub-section 9.2.1.1 should be met, and even if only one of these requirements is not met, it can lead to the failure of the scheme and it will plunge the community into even deeper poverty. The poorer the community is, the less they can pay for the usage of the information and communication technologies in the telecentre and the survival of the telecentre will be at stake. It is therefore important to note that the applicable information and communication technologies to be used in the telecentre should be researched before the establishment of a telecentre.

9.4.2 Secretaries should have a positive approach and the capacity to be trained

The transfer of new technology uses to the trainees is also a most important aspect to be noted. If the secretary of the telecentre did not have the optimistic approach and willingness to be trained in the use of the information and communication technologies, she couldn't have come to the conclusions regarding their financial situation as she did. This was shortly after the establishment of the telecentre: Firstly she could communicate with other agriculture-related organisations, and secondly, and most importantly, she could assist with the computerization the financial and billing system of the WUA in an elementary accounting system in MSExcel. This lead to the Management Committee realizing their financial situation as described above. The ability to use information and communication technologies as well as the applicability of the information, are critical factors in generating and accessing wealth and knowledge. The WUA invited the DWA Chief Director: Institutional Oversight to visit them in order to discuss their problems. The visit by a representative of this Chief Director took place in 2002 and the WUA could explain the extent of their financial problems to the official by means of information disclosed by the accounting system developed in the telecentre.

After this visit the DWA Senior Official drafted a report in the form of a letter (Appendix S) to the Minister, which led to the refurbishment of the canal by DWA.

It is not only the responsibility of the secretary to organise, manage and direct the activities of the telecentre, but the whole community as stakeholders should be involved in the project of establishing a telecentre at their irrigation scheme. The involvement of the farmers is discussed in the next Section.

9.4.3 The community as stakeholders should be involved in the project

According to the PM&E, the community to be developed should be involved in the project from the start. During this study, the farmers were involved from the commencement of the evaluations, as the community were the beneficiaries – community participation formed the basis for development which is why the process of study was called the 'participatory process'. As part of covert communication, the researcher did for instance, wear pure white tops or dresses, as this symbolises "honesty, supportive and reliability" in the African culture of South Africa.

But the community will not be involved in the telecentre project if they do not need or want a telecentre. The suggestion and proposal of the establishment of a telecentre should be made by the farmers as research participants – the farmers themselves should express their demand for the employment of information and communication technologies at their irrigation scheme. An explanation of the situation of the farmers at the Thabina irrigation scheme is presented in the next Section.

9.4.4 There should be a demand for the telecentre to be established

Due to the farmers' changed status as a WUA, their farming needs included 'how and where to buy seeds as well as information about cultivation and irrigation, soil structure, water availability, weather conditions, fungicides, pesticides, markets, market trends', etc. – all of which could be obtained from corresponding with pertinent organisations by means of the telephone or multifunctional printer, which proved to be the most affordable information and communication technologies to a small-scale irrigation scheme in South Africa. They also needed to correspond with other agriculture-related organisations such as DWA, other WUAs, Provincial Departments of Agriculture, the Department of Agriculture, Forestry and Fisheries (DAFF), co-ops and markets.

There should be a demand for a telecentre because this will ensure utilisation of the telecentre and reduce the expense to individuals through the sharing of costs. With this

study, the farmers expressed their need for an information centre (Appendix E). This was because they would have to adhere to many rules and regulations of the NWA. The farmers, as research participants, also realized that they would then have to have information on their farming practices and also that they would have to communicate with other agriculture-related organisations such as DWA, the DAFF, the NPDALE and the ARC, etc.

Although the farmers at Thabina asked for an information centre, they did not comprehend what the concept would entail, as they asked for a demonstration of the information and communication technologies to be presented by the telecentre. After the identification of appropriate information and communication technologies to address the needs of the farmers, training was also presented to two officials. As these officials had no experience in the use of the information and communication technologies, the training material used proved to be effective and sufficient. The importance of adequate training material is explained in the next Section.

9.4.5 Adequate training material should be developed

The training material used in this project, proved to be adequate for the purpose it served. But the MS Presentations Programme was not included. It is consequently recommended that the training material in the use of information and communication technologies for farmers of the developing world, should be applicable to the information to be required from the information and communication technologies. Consideration ought to be given to a university researcher undertaking this as part of a project. Other telecentres have since been established, but nowhere is training material for farmers of the developing agricultural sector to be found. Although the training material used for the Thabina telecentre was very elementary, good use was being made of it for training in the computer usage at the Tswelopele, New Forest and Oppermansgronde irrigation schemes.

This basic training material used to train the officials was adequate, but since the irrigation scheme has established a WUA, it is also necessary to develop technology programmes which could assist the farmers to be able to oblige by the rules and regulations as demanded from the DWA – which could only be performed by means of computer programmes. The importance of these programmes is discussed in the next Section.

9.4.6 Applicable computer programmes should be developed

Although basic and comprehensible accounts could be populated for the irrigating farmers, as with the Thabina farmers, only a few fields were populated in order for the secretary to comprehend (Appendix H). But these accounts, populated for each of the farmers of Thabina, had to be populated one-by-one, which comprised a huge effort from the researcher and should there be a programme for this population included in the training material, it would be much less effort and time-consuming. It is essential to note that an overall computer programme for financial management of a small-scale irrigation scheme, transferred into a WUA, should be developed. It is thus recommended that computer software be selected, or even developed, for the telecentre to handle the financial systems as well as the management systems of farmers of the irrigation schemes who have become a WUA. The simple computerised financial management system which was developed to support of the telecentre, enabled the management committee to have proper control of the monthly financial matters of the WUA. This had a profound impact in terms of identifying the possible dangers in their financial situation, which they could bring to the attention of DWA. This could be done in collaboration with DWA, as there are certain criteria of the DWA that have to be met, according to the National Water Act (Act 36 of 1998) (section 26(b)), such as the amount of water used daily/weekly per farmer and financial information regarding payment of water accounts; the WUAs' Water Management Plan; information regarding elections and representation of different population groups; the annual Catchment Management Charge; and the measured water.

It is consequently concluded that a comprehensive computer programme should be developed by future researchers for the formulation and population of the various fields, according to the demands and requirements of the DWA, in order to computerize the financial system of a WUA according to these criteria. As these small-scale farmers without the information and communication technologies do their systems manually, ample time should be made to consolidate each Ward into a separate file to be populated with data and then to be processed.

Discussing the importance of the development and extension of computer programmes, led to the identification that there are, though, telecentres that do not have Internet connections as such. Telecentres without Internet facilities were discussed in Chapter 2,

but to follow is a more comprehensive view of the operation of these telecentres without Internet connectivity.

In this Section recommendations for the future establishment of telecentres in the developing agricultural sector were made. In the next Section a discussion on the closing reflections on the PM&E evaluation process will follow.

9.5 PM&E REGARDING CLOSING REFLECTIONS ON THE EVALUATION PROCESS

With the adoption of the National Water Act (NWA) in South Africa, there are not only rules and regulations to which the WUAs have to adhere to, but the NWA also clearly propose the establishment of an information structure. These aspects will be discussed in this Section.

9.5.1 Newly established WUAs

This study makes an important contribution to agriculture in the developing world, as well as the commercial, agricultural sector where farmers at small-scale as well as at larger established irrigation schemes in South Africa, are obliged by the NWA to convert their irrigation schemes into WUAs in South Africa. It could be concluded that the farmers at irrigation schemes, small-scale and commercial as well as all Irrigation Boards in South Africa that are being converted into WUA's, will have to comply with several rules and regulations as requested by the NWA**.** These farmers will need telecentres, based on information and communication technologies, in order to be able to comply with the rules and regulations from DWA as well as to communicate with other agriculture-related organisations, which could only be undertaken by means of a thorough assessment, as promoted by PM&E, for the identification, purchase and installation of applicable information and communicate technologies.

9.5.2 Methodology for the establishment and evaluation of a telecentre, a Trust, a cooperation or a Community Development Programme

The generic four-phase participatory process developed for this study for the establishment of a telecentre, was found to be suitable and applicable for the establishment and evaluation of a telecentre. The generic four-phase participatory process was adapted to the circumstances and conditions of the Thabina irrigation

scheme. The precise application of the four consecutive Phases, following careful and accurate monitoring, evaluation and feedback as recommended by PM&E of each Phase, led to the successful accomplishment of the establishment and evaluation of the telecentre.

It was also concluded that the farmers need information by means of the information and communication technologies for their farming practices – not only farmers of the developing world, but also commercial farms. The vulnerability of a telecentre for economic feasibility of agriculture in this inconducive environment, as cautioned by PM&E, was discussed – typical a chicken-egg situation, where the telecentre depends on the economic viability of the scheme, but the scheme depends on the information and communication which can be obtained from the telecentres.

This PM&E study was therefore not only important to those who study the information and communication technologies and the telecentres as such, but also for small-scale irrigation farmers in the developing agricultural sector, and last, but not least, for those in government who rule and regulate the lives of those in this important agricultural sector in South Africa and internationally.

With the methodology examined, the next Section explores and reason whether the research objectives of this methodology used in the study were reached.

9.6 EVALUATION OF ADDRESSING THE RESEARCH OBJECTIVES

These objectives are directed to the goal of this study – to establish and evaluate a sustainable telecentre in the developing agricultural community of Thabina that could enable the most appropriate information and communication in order to address the agriculture-related needs as well as the socio-economic and ICT needs of the community. The second objective was to identify a suitable method according to which the telecentre could be established. These two objectives as well as the questions derived from these objectives will be discussed in this Section.

9.6.1 *The central research objective was to investigate and evaluate a method – a model which was not applied in research before. According to this process a sustainable telecentre should be successfully established in a small-scale irrigation scheme such as Thabina irrigation scheme, situated in the Giyane district in the Limpopo province in South Africa.*

The Thabina telecentre was established and evaluated according to a four-phase participatory process, adapted from a generic four-phase participatory process created from theories and models obtained and selected from various researchers and theorists. This objective was successfully accomplished by means of various practical and step-by-step Actions undertaken towards the establishment and evaluation of the telecentre:

Firstly was the creation of a suitable participatory framework for a generic four-phase participatory process, concluded from participatory project management theories such as The Traditional approach, PRINCE2 Model, Agile project management and the Extreme project management approach. These theories were adapted from the generic four-phase participatory process in order to create a framework for the four-phase participatory process according to which the telecentre was established.

Secondly, Actions were identified from participatory processes such as the Participatory research, The Transfer-of-Technology Model, An Alternative Model: Farmer-First-and-Last, the theory, Rapid Epidemiological Assessment. According to these theories, participatory Actions for the generic four-phase participatory process were selected. The participatory Actions for the establishment of the telecentre were identified and selected from the generic four-phase participatory process and successfully applied and completed with the establishment of the telecentre. This four-phase participatory process gave structure to the study and could be beneficial to future researchers in the developing agricultural sector at small-scale irrigation schemes in South Africa. Each Phase had its own Actions as well as data collection methods such as feedback sessions and participatory observation with evaluations as promoted by PM&E. The consecutive phases of the participatory process lead to the systematic identification of agriculture-related information needs as well as the socio-economic and ICT needs as well as the identification of appropriate information and communication technologies to be bought in order to address these needs.

Thirdly it could be mentioned that Thabina being a small-scale irrigation scheme in an arid, former homeland the Thabina irrigation scheme had the same economical and survival problems (Appendix A) as the other irrigation schemes in the former homelands, namely that government grants were withdrawn in 1994. This meant that the telecentre had to survive financially solely on income. The telecentre was the only support structure the farmers as research participants have, and is, corresponding to the PM&E, sustainable according to the various aspects as explained in Chapter 8.

9.6.2 *A second objective emerged regarding whether this research could result in the creation of a viable method to engage information and communication technologies in the telecentre in order for the telecentre to be able to communicate. Communication would include socio-economic as well as agriculture-related information.*

The Thabina telecentre functioned well with information and communication technologies such as the computer, a telephone and the multifunctional printer. These information and communication technologies were identified after surveys were undertaken regarding the agriculture-related information needs as well as the socio-economic and ICT needs of the farmers. Information and communication technologies needed for these two sets of needs were compared and discussed in detail in feedback sessions, as advised by PM&E with the Management Committee. During these collaborative sessions with the Management Committee, it was decided which information and communication technologies would be bought – for instance without an Internet connection as the farmers "do not have the funds available now".

The socio-economic needs of Thabina and the surrounding communities were identified during the structured interviews (Appendix F) and were also addressed as explained above in Sub-section 9.2.2.2.

Before the establishment and evaluation of the Thabina telecentre, the farmers used the telephone as a personal and basic communication medium. By means of addressing the communications pillar by means of the information and communication technologies, identified as the computer, the telephone and a multifunctional printer, the telecentre contributes positively to three of the eight pillars listed above, namely:

- to enable continuous training of farmers and labourers
- availability of applicable farming information
- to supply the logistical support for the efficient functioning of an institutional organisation

During the feedback sessions as advised by PM&E, the Management Committee commented that the information and communication technologies not only played an important role in the support of the community and peoples from surrounding communities in using the information and communication technologies, but also affirmed the remarkable and important role these information and communication technologies

played in the survival of the farmers and the telecentre as such, which has been explained throughout the study

The following questions to address were derived from the above two main objectives of the study, and will be discussed below:

9.6.3 *What would be an appropriate model for the planning, execution and evaluation of a rural agricultural telecentre?*

A comprehensive study was meticulously undertaken in order to identify a model for the planning, execution sand evaluation of the rural agricultural telecentre at Thabina. Models from various researchers, academics and theorists were explored (Chapter 4). From these models, a generic four-phase participatory process was created and constructed with its own framework and Actions to be undertaken in each of these Phases. This generic four-phase participatory process could be applied to the establishment and evaluation of a telecentre, a Trust, a Cooperative or a Community Development Programme. This generic four-phase participatory process could therefore be applied as an appropriate model for the planning, execution and evaluation of a rural agricultural telecentre, since the Actions could easily be adapted and customised to the specific circumstances of the research participants in a study – as was undertaken and successfully executed with the farmers at the Thabina irrigation scheme.

9.6.4 *To what extent will a participatory, bottom-up approach be a suitable theoretical departure point for the investigation and evaluation of a four-phase participatory process for the establishment of a sustainable telecentre in a small-scale irrigation scheme in the Limpopo province in South Africa? Could the involvement of the researcher with the research participants, by means of taking field-notes and discussing and explaining all decisions taken with the research participants and involving the research participants in the preparing of documents, establish enough rapport with the research participants to win their trust for them to be willing to participate in the study?*

The bottom-up approach is widely supported and encouraged by PM&E and the application of this approach played a pivotal role in the success of the establishment and evaluation of the telecentre. The participatory bottom-up approach as recommended by PM&E, of the study formed the basis of all communications and decisions made.

The farmers also appreciated that their culture, as one of the prerequisites by PM&E such as language by means of translators and interpreters and illiteracy which was

addressed by the usage of sketches and indigenous communication system (oral) were acknowledged. As the farmers' indigenous communication system was mouth-to-mouth, all discussions took place through interpersonal and participatory communication.

It could be mentioned that the feedback sessions, as part of the fundamentals of PM&E played an enormous role in the successful establishment of the telecentre. The importance of feedback sessions in the form of participatory discussions as encouraged by PM&E should not be underestimated. The feedback formed an important role in the preparations, the performing and the accomplishment of each of the Actions in the various phases, should corrective actions be taken. It also played an important role in solving problems that could have occurred to delay the establishment of the various Actions.

9.6.5 *What are the roles of the infostructure and infrastructure and access to such a sustainable telecentre at a small-scale irrigation scheme in the Limpopo province in South Africa? The infrastructure will be new to the research participants – will they be confident to engage in such a new venture? Could the infostructure be applicable to the research participants – will they understand the messages and will they need a manager at the telecentre to translate the messages from the information and communication technologies into their own indigenous languages?*

The study showed that the relationship between infostructure, infrastructure and access is one of dependency. This means that the one cannot function optimally without the other. The computer for instance, as part of infrastructure, provides, creates, manages and disseminates appropriate information (infostructure). The secretary adapted information to suit the indigenous oral communication system of the farmers because she packaged it in their comprehensible language. Appropriate and understandable information (infostructure) was obtained from the information and communication technologies, since the computerising of the financial system, led to the Management Committee realising their financial dilemma. The typing of documents for the Management system, were used by learners and students and also for private documents such as CVs.

The training as encouraged by PM&E, of the secretary as well as the Vice-Chairman of the Management Committee – especially as new users, led to the identification of the financial management situation described earlier in Chapter 7. The secretary also applied the management system of the WUA by ordering seeds, etc. from the

Cooperative. Not only the Thabina community, but various users from the surrounding schools and technikon also used the information and communication technologies to their benefit.

9.6.6 *Which information and communication technologies could be identified and acquired for a telecentre at a small-scale irrigation scheme in the Giyane district in the Limpopo province in South Africa? Could suitable and applicable information and communication technologies be identified which could enable constructive communication systems to the farmers at an irrigation scheme?*

The categorised agriculture-related information needs were integrated with the identified socio-economic needs and ICT needs in collaboration with role-players as encouraged by PM&E. The most important conclusion from both these assessments was that the information and communication technologies to address these two sets of needs, posed to be the same, namely the computer without Internet connectivity, a telephone and a multifunctional printer. A library was also established with various booklets, brochures and infotoons (Appendix L) By incorporating the technologies to address both these sets of needs, meant that the appropriate information and communication technologies which would address both these sets of needs were identified, bought and implemented as described in Chapter 7 – the computer, a telephone and a multifunctional printer.

9.6.7 *How can the members of the small-scale irrigation community of Thabina be transformed from recipients of technological know-how into providers of technological know-how? Could the research participants learn to manage and operate the information and communication technologies to the extent where they could become not only recipients, but also productive users?*

- *What is the importance of setting up guidelines for the running of a telecentre? With previous experience in the operation of the information and communication technologies, and if not, would he/she be willing to learn how to operate the information and communication technologies?;*
- *Could he/she be able to translate the messages from the information and communication technologies into the indigenous languages of the peoples;*
- *Could the Manager assist to train the community members in the usage and operation of the information and communication technologies?*

Through the telephone the farmers ordered seed, received weather information and communicated with other agriculture-related organisations such as the ARC, DWA, NPDALE and the DAFF as well as co-ops and markets. The farmers could also obtain information on their problems such as the canal, drought and water pumps which are vital to their farming activities via their fax. These matters were seen as of critical importance, and the Chairman of the Management Committee wrote a letter to the DWA stating their problems. This letter was also submitted to DWA. The farmers could also obtain information on their farming practices via the library (Appendix L) as well as the newsletter of the DAFF, *AgriNews*, and the newspaper *NuFarmer*, aimed at the small-scale farmer. These publications were delivered to the telecentre for free. This means that the research participants, who had no experience in the use of technology, learnt and acquired the useful knowledge to systemize and computerize their management system as well as their financial system, which did, as explained, drew their attention to their dismal financial situation.

Documents comprising guidelines for the management of a telecentre as well as a Project Plan were extensively examined and considered in participatory discussions and then compiled in collaboration with the Management Committee during meetings, as required by PM&E. All suggestions, questions and answers were incorporated in feedback sessions, until the meetings were satisfied with the final products. These documents formed a constructive and valuable basis for the effective and practical day-to-day management of the telecentre as well as the management of the WUA which both proved to be successful, as the telecentre flourished.

The secretary played and important role in translating messages received from the information and communication technologies to those farmers who did not understand English, the language used by the information and communication technologies. These were mostly technical aspects received from DWA regarding the WUA as prescribed by the NWA. For the illiterate farmers, the secretary translated the Agendas and Minutes from meetings of the Management Committee which she typed on the computer and printed on the multifunctional printer, into the indigenous language.

9.6.8 *What sustainability evaluation measures are appropriate for evaluating a rural, agricultural telecentre, established by means of the model?*

In Chapter 4, in Sub-section 4.2.4.5, it was explained that theorists and researchers promote the evaluation of a project according to various aspects involving the community to be developed. These aspects as applied to Thabina, are evaluated next:

Regarding **social and cultural sustainability** the researcher ensured that the indigenous language of the farmers was taken into consideration: The Management Committee explained the outcome of the formative evaluations to the farmers. During field-notes taken, the farmers also discussed the specific Action among themselves and explain to the researcher their impressions, feelings and thoughts thereof in English.

During the structured interviews, the researcher ensured that the interview on the flip charts, as well as those to be completed, were in the indigenous language, as well as in English.

The researcher made contact with the nearby clinic for addressing health aspects as well as made contact with the nearby schools in order to establish ties for future educating in languages. These Actions ensured that the Thabina community formed part of the project and accepted the telecentre as their own, which supported the social and cultural sustainability of the project.

The researcher ensured to address various unforeseen needs that influenced the successful running of the telecentre. These needs were identified during the course of the four-phase participatory process, as explained in Chapter 7.

Regarding **political sustainability** the researcher ensured that Chief Mahlaba was involved from the inception of the project by explaining the project to him and gaining his approval for the establishment and evaluation of a telecentre at Thabina. By means of the bottom-up approach followed throughout the four-phase participatory process, the researcher managed to establish good rapport with not only the Management Committee, but also the farmers as research participants. Consequently, the farmers gave their full participation through-out the project.

Regarding **technological sustainability** the researcher ensured that appropriate training material was used to train the trainees. This resulted not only in the computerising of the management and financial systems, but also to address needs of the surrounding villages in the Thabina community. The result was that the surrounding villages also made good use of the information and communication technologies which led to a good income.

The researcher ensured to train the secretary to the extent that the information and communication technologies also served the most important aspect of receiving applicable socio-economic as well as agriculture-related information, which the secretary was able to translate into the indigenous language for those who did not understand the language of the technologies.

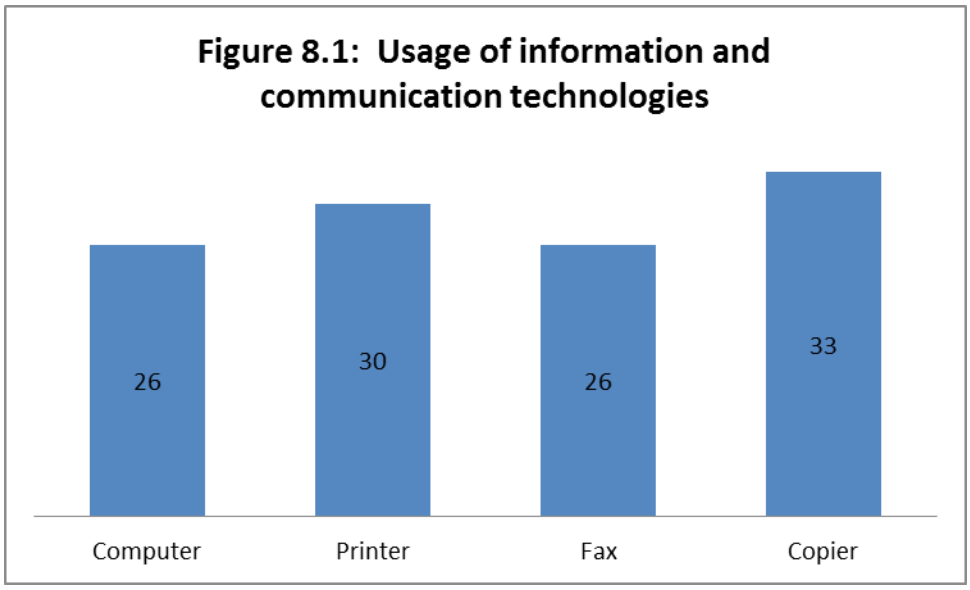
Regarding **financial sustainability** the researcher recommended, verified and assisted that the following assessments on the usage of the information and communicate technologies were undertaken, in order to ensure that these technologies could provide the essential and required income for the telecentre to be financial sustainable. The outcome proved that the telecentre was financially stable. This positive outcome was also due to the fact that the training of the secretary in the usage of the information and communication technologies to assist the users was applicable. These assessments made of the usage of the information and communication technologies, showed an optimal use as proved and explained blow:

Tables completed on the usage of the information and communication technologies were compiled by the researcher in collaboration with the secretary. These assessments were conducted by the secretary herself in the telecentre. Empirical information showed that the expected daily usage of the information and communication technologies exceeded the theoretical expectations:

- **Assessment of the usage of the computer and the multifunctional printer**

The form on the use of the information and communication technologies, the computer and the multifunctional printer (Appendix M with price list) over a period of two months, was compiled in collaboration with the secretary of the telecentre. The secretary noted the uses and completed the form. According to the outcome of the assessment, 115 farmers used the information and communication technologies, (except for the telephone that is discussed below): 26 clients used the fax, 30 clients used the printer, 33 clients used the copier and 26 clients used the computer. Note that a higher percentage of clients used the printer than the computer. This just shows again the importance of the competence of the secretary in the completion of questionnaires. According to the secretary, there were farmers “who only wanted to print documents and did not want any changes or other use of the computer”. Therefore the researcher noted them only as using the printer.

Figure 9.1: Usage of information and communication technologies



Source: Researcher's calculation from assessment

This means that clients visiting the telecentre, used the copier and the printer the most. The minimum income from the fax was R40,00, from the printer R42,00, the copier R46,00 and the computer R40,00, which gave a total income of approximately R160,00. Although the usage seems low, it should be taken into consideration that these figures do not include the use of the information and communication technologies by the secretary herself. Income from the information and communication technologies was generated from the following:

- **Management** (secretary):
    - Financial system: The secretary assisted in creating the financial system and was also trained to use the computerised financial system. Therefore she

included the following in her Financial system: It was approved by the Management Committee that R3 of the levies paid for the WUA per farmer would be donated to the telecentre per month, until the telecentre was functioning optimal and sufficient funds had been saved for larger expenses such as a new drum for the multifunctional printer, etc. when needed. According to telecentres in the agricultural sector, analysed in literature, this is a standing practice at irrigation schemes world-wide.

- Management system: Compilation of documents such as receipts; daily records; and copies services rendered such as the making of telephone calls including the income to tally with the income received from these services; balancing the expenditure of the monthly accounts such as electricity and telephone accounts with the income generated – in order to determine whether the services are economically viable to carry on with these services.

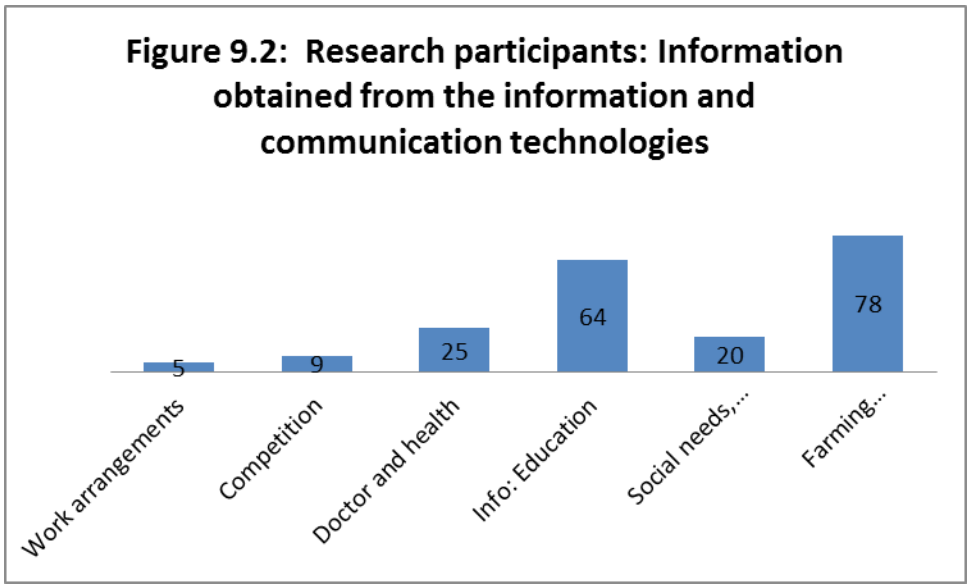
- The **farmers**: From answers to the close-ended question with categories on "How did you mostly benefit from the telecentre?", it became clear that the users could obtain the following (Figure 8.2): farming information (91,2%), information on education and learning (76,6%), social needs and friends (17,6%), doctor or health (14,7%), security and emergency (8,8%), work arrangements (5,9%) and also for a competition (8,8%). It was clear that the most farmers wanted to obtain information on farming practices. This outcome was expected, as Thabina was a farming community. This means that by means of the information and communication technologies, sufficient and appropriate information could be obtained from the information and communication technologies in order to address not only the agriculture-related needs of the farmers, but also their socio-economic needs such as Curriculum Vitae's and private letters, typed and printed by the secretary for the farmers;

- Surrounding **schools**: Limpopo is one of the provinces that suffer from a huge lack of school-books. Therefore the teachers used the information and communication technologies to make copies of handbooks and manuals, as well as to print their forms, records, papers and other documentations. The teachers used the colour copier for copying of the documents such as pamphlets, certificates, ID's and brochures. The secretary assisted the learners in the compilation and printing of their Curriculum Vitae's, their assignments and projects;

- The **Playgroup** also made good use of the information and communication technologies, as it included a colour printer to make copies for their colouring books. The secretary also assisted them to compile and print letters, memorandums, and various types of notes for the parents.
- The **Technikon**: Lecturers used the information and communication technologies to compile their brochures and monthly In-house Journal. The secretary assisted the students with the typing of their assignments and to make copies thereof.

Although the Thabina telecentre could not at that stage be connected to the information super-highway by means of the Internet, this outcome proved that suitable and applicable information and communication technologies were identified which could address the agriculture-related as well as the socio-economic needs and ICT needs of the farmers, along with the needs of the surrounding communities. The main expenses that the telecentre had, was to buy stationary such as paper, pens, pencils and ink as well as to pay for maintenance aspects for the information and communication technologies. From the income generated, these expenses could be addressed. This means that from a financial point of view, the telecentre proved to be sustainable.

Figure 9.2: Research participants: Information obtained from the information and communication technologies



Source: Researchers calculations from assessment

This also corresponded with the fact that most farmers used the information and communication technologies to obtain farming information (78) and information on education (64). To note is also that doctor and health (25) is a higher calculation than social needs, friends (20). Another use was to enter into competitions (9) with work arrangements but a 5 respondents.

- **Assessment on the usage of the telephone**

This assessment was undertaken by the secretary in the telecentre during one month. According to the usage of the telephone (December 2006) (Appendix N), it seemed as if this was the most used technology. During one month 638 calls were made by the community and 437 calls were received. The large Standard Deviation also showed that some days more calls were made and received than on other days. This difference from the mean could be due to the farmers being occupied with their farming activities on specific days; the learners having to obtain information on particular days for their individual projects and assignments; and members of the community in general having specific needs on specific days.

If the users did not have a telecentre at Thabina, most of them (63,8%) would have had to travel to Tzaneen (40%), Letsitele (18,8%) and Giyane (25,0%). The distances they would then have to travel varied between 4 kilometers and 101 kilometers with a mean of 19 kilometers.

This Section evaluated the sustainability according to the various forms and categories of sustainability as suggested and recommended by various researchers, academics and theorists. The next Section will present the summary of the Chapter.

9.7 SUMMARY AND CONCLUSIONS

This chapter explained and justified how the research objectives of the study were addressed and good practice identified through PM&E. Aspects to take into consideration with the establishment of a telecentre at a rural irrigation scheme in South Africa were discussed and various recommendations for future research in the establishment of a telecentre at a small-scale irrigation scheme in South Africa were made. The data gathered and applied were evaluated in the study was also evaluated and was found reliable and valid.

The evaluation of the establishment of the rural, agricultural Thabina telecentre was based on the participatory monitoring and evaluation method, the PM&E, which proved

to be the most successful method for evaluating an ethnographic study of this nature. The researcher identified the PM&E method by meticulously and successfully studying numerous evaluation methods from theorists, academics and researchers and proved that the PM&E method applied for the evaluation of the establishment project was applicable and effective. By evaluating the establishment of the Thabina agricultural telecentre by means of PM&E, it was proved that the establishment of this telecentre which was undertaken according to the four-phase participatory process was successful and fruitful.

By means of the exploration and investigation of various theories, models and concepts of numerous theorists, researchers and academics, the four-phase participatory process was created with a framework of four Phases as well as Actions to be undertaken in each of the four Phases. The evaluation of the establishment of the Thabina telecentre could be easily comprehended and followed since the Chapters of the study explained the evolving and unfolding of the evaluation of the establishment of the telecentre by means of relating the Chapters according to the various Phases, namely Chapter 5 on the Pre-establishment Actions that had to be undertaken and looked into before the establishment project could begin, Chapter 6 regarding the Preparatory Actions that were carried out before the establishment of the telecentre could commence, Chapter 7 on the implementation of the telecentre as such, and Chapter 8 regarding the evaluation of the various actions undertaken.

The evaluation of the establishment project proved this four-phase participatory process to be an effective and successful process – with the bottom-up approach which included feedback sessions as directed by the PM&E and substantiated as a useful and valuable process which can be applied in future by researchers, donors and role-players involved in the establishment of a Trust, a Cooperation or a Community Development Programme.

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APPENDICES

APPENDIX A

Factors hampering sustainability at the Thabina Water User Association

1 Generally necessary requirement that were not met

The recommended and essential eight pillars (Backeberg, 2002) for the sustainability of any irrigation scheme, are the following: An appropriate Institutional structure (WUA); Natural resources (water, soils, climate); Capital and financial support (access to capital and financial support); Infrastructure (dams, canals, weirs, pumps, power supply, roads, fences); Production skills and know-how (knowledge of farming including the indigenous system and knowledge); Farming systems (the specific type of farming used); Markets (local and national markets); and Support structures (commercial supply of seed, fertilizer, mechanization parts, irrigation equipment, extension services). In the situation of the Thabina irrigation scheme, both the Limpopo Department of Agriculture, Forestry and Fisheries (LDAFF) and the Department of Water Affairs (DWA) – the two main government departments involved – addressed only three of these pillars, which ultimately lead to the failure of the Thabina irrigation scheme at a stage. The failure of only three of the eight pillars being present, was therefore a result of the lack of a comprehensive developmental approach by Government which caused all support structures to fail (Stimie, 2010) – regardless of the established telecentre that continued to address the needs of the farmers of Ward A and Ward B (nearest to the canal) who stayed on their plots.

But during 2007 the future looked bright again as the canal was filled with rain water and most of the farmers who had to leave their plots, returned (C and D). DAFF eventually promised R5 million for upgrading the irrigation scheme by 2009 from the RESIS Programme.

The following aspects influencing the sustainability could therefore be derived and categorizes as the following:

- In terms of the **Institutional aspects**, the Thabina irrigation scheme has become a Water User Association (WUA). This was the main reason for undertaking this research project, as the farmers now had to comply with several rules and regulations of DWA, for which they had to have communication tools such as a computer or a printer-copier-fax-scanner. The implementation of these technologies lead to the farmers being able to obtain, according to the National Water Act (NWA) (Act 36 of 1998), support and assistance from DWA. Thabina irrigation scheme had to apply for approval to the relevant minister for a WUA to be established. This happened in 2001 and since then the irrigation scheme properly functioned according to the delegated powers allowed by the NWA.

Since then the farmers kept in contact through the telecentre with DWA and other agriculture-related organisation. Training of various kinds was given to the Management of the WUA including computer literacy for the use of the telecentre. these aspects could be seen as successfully accomplished. The impact of this was that the farmers could adhere to the prescribed rules for a WUA.

- **Economic aspects:** Due to circumstances beyond the control of the Thabina WUA, government Departments promised various ways to assist the WUA, including financial assistance to investigate the provision of a dedicated storage dam to supply more water to Thabina as well as to upgrade their much needed infrastucture. But alas, these promises were never fully kept. Various departments were involved in assisting these farmers, and various prescriptions and procedures had to be followed by these departments, in order to comply with control measures within government, such as the Public Finance Management Act (Act 1 of 1999) (PFMA). Take note that a WUA is a government institution which should apply with rules and regulations such as financial statements, to DWA.

2 Negative circumstances specifically encountered at Thabina

The influence of these economic aspects lead to a scarcity of water, which in turn lead to some farmers leaving their plots looking for alternative sources of income. This had an immense negative influence on the telecentre itself, because some farmers did not have enough water to irrigate that would lead to higher yields, and then enough funds to pay for the usage of the technologies in the telecentre, Only two of the four Wards, (Ward A and B) remained at the irrigation scheme. But the farmers returned after good rains and the telecentre was used by all farmers. The farmers were also promised the implementation of the RESIS Programme, as discussed earlier, and the future of the irrigation scheme as well as the telecentre looked bright. The economic factors that had this impact on the WUA are explained below:

- The infrastructure (canal system) was partly refurbished during the time that Thabina applied to become a WUA. For that reason the farmers as well as government believed that no further work would be necessary. But soon it became clear that serious water shortages occurred and that investigations should be undertaken, either by the departments self, or through consulting engineers, to determine whether these shortages could possibly be rectified by further infrastructure. DWA has found that there is not enough water in the canal at Thabina WUA to irrigate. The reason being that there are a township, Lenyenye and other communities living stream-up, using the water from the canal.

- Two studies were undertaken by DWA in an effort to proceed with the matter. the first was a socio-economic investigation of the economic feasibility of the scheme, done through the University of Pretoria, in person Perret (2000). This study was undertaken to identify and undertake any possible changes that could be made to existing practises on the scheme like crop combinations, marketing strategies and the plot sizes. The study was completed and valuable results were discussed with the Management Committee, requesting that they should apply this to their farming practices. It is also important to note that the farmers expressed their need for a 'telematic centre' (Perret, 2000).
- A second study entailed a hydrological analysis of the catchment area of the Thabina River upstream of the scheme in order to establish any possible additional water resources that could be developed in the form of additional storage in the catchment area of the Thabina River upstream of the Thabina irrigation scheme. Both these studies were undertaken by the then DWAF. This hydrological study was not completed by DWA due to the resignation of the engineer that undertook the study and his replacement has never proceeded with the study. Early indications, though, showed that any small addition to available water would cost millions of rands and would anyway not supply enough additional water to the scheme to ensure that the farmers could become successful. Although early indications were not promising, further investigations needed to be done because of the importance of the outcome. Questions that should be answered include whether they could build a dam; how far is the dam from Thabina; and the costs for a pipe-line.

Because of the desperate situation in which this scheme found itself, it was eagerly awaiting support and assistance form the government. Alternative water resources should have been investigated with the necessary financial support to be obtained form DWA and the DAFF. Coordinating Committee on Agricultural Water (CCAW) meetings are held regularly between these two parties. During these provincial meetings, the irrigation schemes are discussed, but eventually no support was given to the Thabina irrigation scheme. Government has lost so much of its expertise and capacity, that the support which the government should provide has in some cases nearly come to a standstill. In the meantime, other problems were encountered, such as cables being stolen. In some instances they waited up to six months for the police, which meant that there could be no crops cultivated.

The environment in which this telecentre had to operate, has thus changed from positive to negative and influenced the fruitful operation of the telecentre to the farmers as such. In the end it was not only agricultural aspects such as a too small canal, droughts and water scarcity, but also their water pumps and copper cables for electricity, vital for the operation of

the technologies, except for the phone, were vandalised and stolen. At a meeting with the farmers, the following were also noted, explained and discussed. The transformer for the electricity supply to the irrigation scheme, which also serves the telecentre, was also stolen during one of these incidents. The robbers were apparently armed, the technologies of the telecentre were also stolen during one of these incidents. Recovered by the police, the technologies were removed to Berlin to be stored for a while until the ceiling could be repaired.

Notwithstanding this inconducive environment in which Thabina telecentre had to operate at this stage, the telecentre still operated by means of the library and the telephone as another type of telecentre, namely the phoneshop (IDRC, 2007). The farmers could order their seeds and farming-related necessities from the co-operative by means of the telephone. They could also communicate with other agriculture-related organisations such as Limpopo Department of Agriculture, the DWA, the Agricultural Research Council (ARC) and the Department of Agriculture, Forestry and Fisheries (DAFF), the International Water Management Institute (IWMI), the Water Research Commission)WRC) and others.

The main concern of the farmers regarding their farming practices was water distribution – the basis of their problems. The Chairman wrote a letter to DWA and DAFF regarding their problems and their main concerns were the rehabilitation of the irrigation infrastructure; the main canal; water pollution; cleaning and repair of the two night storage dams; repair of subsidiary canals used by farmers for irrigation; pumping of water from the Thabina River; and other outstanding necessities such as fencing and security.

The Thabina irrigation scheme relied on the support of government, for instance for the repair of the roof and the ceiling which could have been undertaken by the DAFF immediately after the burglary in order to house the technologies in the telecentre again. The roof and the ceiling were fixed only some months after the burglary by the DAFF, to whom the buildings belongs, and the technologies were restored.

It is therefore important for future researchers in the information as well as the agricultural sectors, to note that public interventions such as telecentres which facilitate access to information, as explained by Van Averbeke and Mohamed of Tshwane University of Technology, are of utmost importance for the sustainability of telecentres, especially at newly established WUA at small-scale and other irrigation schemes in South Africa – not only for the development of the community, but also to bear up against the inconducive environment at small-scale irrigation schemes, especially those in the Limpopo Province.

APPENDIX B

GA : Figure A2: Interview Schedule

Northern Province Irrigation Schemes

Community Pre-development interview schedule

What is the size of your land? _____

Are you male or female? _____

What is the size of your family? _____

How many people can read or write in your family? _____

Is this a male or female-headed household? _____

What would you say are your major problems? Indicate whether the problem affects men, women, old people or youth. _____

How can these problems be overcome? _____

What would you say are your major Needs? _____

How can this community best improve its standard of living? _____

Do you have or own cattle and how many are they? _____

What do you use to plough your land? _____

Who is responsible for the farming activities? _____

Where do you acquire your inputs? _____

What support services are available to you? (e.g., training, extension, markets, sources of inputs, tractor services) _____

Are you satisfied with your extension services? _____

What type of training do you think extension officers need? _____ None _____

Do you need training? ____

Can surrounding established commercial farmers be of assistance in the development of the irrigation scheme? _____

What crops are you currently growing? _____

How many meals do you have per day? _________

How much maize meal do you consume as a family per month/year? _____

Do you produce enough maize to last you a year? _____

If you do not produce enough to last a year, how much do you spend on purchase of maize meal? ____ _____

Would you say that people farming in the irrigation scheme have a better standard of living than those not farming in the scheme? _____

What are your other sources of income apart from farming? _____

How important are pensions? _____

Do you have adequate knowledge of Irrigation? _____

Do you wish to farm commercially? _____

Are you prepared to grow other crops such as high value sub-tropical fruit trees? _____

_____

Who do the canals and pipes belong to? _____

If government hands over the scheme to the people, do you think farmers can collectively own and manage the scheme? _____

Do you have PTO for all the lands you use? _____

How important are title deeds to you? _____

Do you want to farm your plot or keep it for security? _____

Would you be willing to rent out your land? _____

Are you prepared to take a loan from a bank to finance a commercial plot? _____

Do you sell part of your produce and where? _____

Is there a problem of theft in the irrigation scheme and who do you think is responsible? _____

What are your major fears and aspirations? _____

What social problems do you experience? _____

Is ill health common in the village and what are the illnesses? _____

What is the situation with water for drinking, cooking and washing? _____

How does the water for the irrigation reach the fields? _____

What do you do if there is a problem with the water? Who fixes it? _____

How do you irrigate? How often, how much, how?

_____

How far is your house from your fields? _____

Do people use tractors and inputs from government only or can they also get it somewhere else? _____

_____

Where do the children go while mom works in the field or goes somewhere to sell her products?

_____

APPENDIX C

farmers can help in the development of the scheme by assisting with equipment, technical advice, finance and training.

4.6 PROBLEMS, NEEDS, FEARS AND ASPIRATIONS OF THABINA IRRIGATION SCHEME FARMERS.

Table 3 below summarises the problems, needs fears and aspirations of the Thabina farmers as identified during the survey. Problems are in order of priority(Column 1).

Table 3

Summary of problems, needs, fears and aspirations of farmers at Thabina Irrigation scheme.

PROBLEMS	NEEDS	FEARS	ASPIRATIONS
Inadequate water for irrigation.	Reliable water sources needed e.g. construction of a dam, and drilling of bore-holes.	Drought and therefore hunger.	Sufficient irrigation water which will ensure food security for the farmers.
Damaged main canal and sub canals.	Repairs and upgrading of canals.		Scheme rehabilitation.
Theft of produce in the lands by the resource poor. Thieves also cut fences such that livestock enter the scheme.	Security to prevent theft.	Hunger and deprived income.	Implementation of some form of a security system.
Shortage of tractors and poor tractor services.	Additional tractors and provision of adequate tractor services.	Low yields.	Higher and better quality produce.
Inadequate water pumps and frequent breakdown of pumps.	Repairs to broken down pumps and additional pumps needed.		
Access to water for drinking (Lefara Village)	Upgrade the domestic water pipe system.		
Poor service by Mpumulana Co-operative.	Upgrade the business management aspect of the co-operative.		Easy access to crop inputs.
Transport to markets is a problem.	A more efficient marketing system.	Loss of income.	Sale of good quality produce in order to improve income and have a better standard of living.
Poor performance by extension officers.	Transport and further training for the extension officers.	Low yields.	

PROBLEMS	NEEDS	FEARS	ASPIRATIONS
Lack of Title Deeds.		Loss of Land to government.	To own the land, invest and become self sufficient.
Lack of credit facilities to purchase crop inputs and equipment such as Knapsack Sprayers.	Access to credit.	Poor production by farmers.	To become more productive farmers.
Wild animals and rats feeding on produce or destroying crops.		Loss of produce.	
Farmers lack knowledge and crop production skills.	Further training of farmers in all production aspects.	Low quality produce and low yields	Self sufficiency.
Land (size) is inadequate.	Open up more land for farming and new projects such as piggery, poultry for income.		Additional income from other sources.
Soil erosion a problem as contours have been ploughed down.	Construction of contours to prevent soil erosion by water.	Soil Loss and nowhere to farm in future.	
Poor water flow in the lands.	Land levelling.	Poor irrigation.	
Unavailability of vegetable seedlings.	Construction of a nursery to supply seedlings to farmers.		
Walk long distance to clinic	Build clinic near Lefara		
Children travel too far to school. (Zangoma village)	Secondary school		

All respondents stated that their major problem in the irrigation scheme was inadequate irrigation water. Water is available mainly in summer when the Thabina River is flowing. When flow stops, farmers pump water from pools in the river, but this is inadequate to last until the following rainy season. Inadequate water is blamed on the Thabina dam that was constructed a few kilometres upstream of the irrigation scheme, damaged irrigation canals, and frequent breakdown of pumps. There are certain sections of the irrigation scheme, especially in the north where water never reaches and these farmers now depend solely on summer rains for their farming. Respondents suggested that there was need for construction of a dam to supply water to the scheme, rehabilitate the weed infested storage dam in addition to drilling bore-holes and purchasing more water pumps.

Land in the irrigation scheme is under the ownership of the local tribal authority, Chief Muhlaba. A person requiring a plot in the irrigation scheme applies to the chief through the extension staff. Farmers are issued with a Permission To Occupy Certificate by the magistrate via the chief when they are allocated a piece of land.

APPENDIX D

Received from DG's office: 2001-12-07
Signature:

Referred to: ADG: SRMU
on: 2001-12-07
Signature:

Instruction Form

Office of the Director-General
National Department of Agriculture

To:
- ☐ DDG: AEBD
- ☐ DDG: APRM
- ☐ DDG: PPME
- ☐ COO
- ☐ CFO
- ☐ ADG: FSD
- ☐ ADG: TBD
- ☐ ADG: REA
- ☐ ADG: AP
- ☑ ADG: SRMU
- ☐ ADG: NRS
- ☐ ADG: AG
- ☐ ADG: CPIM
- ☐ ADG: FM

From: Director-General

Re: DEVELOPMENT AND PROMOTION OF A TELECENTRE AT THE THABINA IRRIGATION SCHEME

Please Find Attached	Received On:	Our Reference:
LETTER & ATTACH	2001/11/28	00/ 6059

- ☐ Draft Reply for DG's signature
- ☐ Draft Reply for DM's signature
- ☐ Draft Reply for Minister's signature
- ☐ Reply for your signature
- ☐ Comment and Advise
- ☐ Investigate and Report
- ☑ Futher Action and Report
- ☐ Dicuss with DG
- ☐ Per Conversation / Meeting
- ☐ Personal Opinion
- ☐ PSLE Note
- ☐ Circulate
- ☐ Disposal

Remarks: Good work.
Can't we finance the info technology under the Rural Information Centres initiative or Marketing initiative. Its so small an amount yet the potential impact is great.

Bongiwe Njobe
Date: 6/12/01

Follow Up Date:

Internal Office Instruction(s) / Notes (DG's Office Only)

Wednesday, November 28, 2001

APPENDIX E

Thabina Irrigation Scheme
P O Box 696
LETSITELE
0885

25 July 2000

Mrs D van der Merwe
Media Liaison Officer
ARC Institute for Agricultural Engineering
Private Bag X519
0127 SILVERTON

Dear Mrs van der Merwe

INFORMATION CENTRE

We wish to confirm our interest in the establishment of an Information Centre at Thabina Irrigation Scheme.

We are a pilot project for the transfer of ownership of smallholder irrigation schemes from Government to the farmers. The Information Centre will be of great value to us in obtaining information that we can use to manage our project well.

The Department of Agriculture in the Northern Province has agreed to support us by providing an official to run the Centre.

Thank you for your interest in us and we look forward to working closely with you.

Your sincerely

THABINA IRRIGATION SCHEME
DEVELOPMENT COMMITTEE

APPENDIX F

SURVEY: THABINA IRRIGATION SCHEME
NDZAVISISO: XIKIMI XA KU CHELETA XA THABINA

- **I DEMOGRAPHIC**
  MUXAKA WA VANHU NA

&

- **II CURRENT EXPOSURE TO COMPUTER TECHNOLOGY**
  XIYIMO XA SWESWI XA VUTIVI BYO TIRHISA SWA KHOMPHYUTA THEKINOLOJI

I DEMOGRAPHIC: Farmers
MUXAKA WA VANHU: Varimi

1 **NAME / VITO**_____

2 **WARD / WADI**

1	A	
2	B	
3	C	
4	D	

Plot no / Nomboro Ya Puloto _____

3 INCOME: FARMING
MUHOLO: VURIMI

3.1 Full time / Nkarhi Hinkwawo

1	Yes / Ina	
2	No / E-e	

3.2 Part time / Nkarinyana:

1	Yes / Ina	
2	No / E-e	

4 Do you have a full time/part time job OTHER THAN farming /
Xana u na ntirho wun'wana wa nkarhi hinkwawo/nkarhinyana HANDLE KA vurimi?

1	Yes / Ina	
2	No / E-e	

4.1 Full time such as / Nkarhi hinkwawo tanihi

_____

4.2 Part Time Such As / Nkarhinyana tanihi

_____

5 FAMILY / NDYANGU

5.1 WIFE'S/HUSBAND'S NAME / VITO RA WANSATI/WANUNA

_____

5.1.1 Does he/she have a full time/part time job except farming / Xana u na ntirho wa nkarhi hinkwawo/nkarhinyana handle ka vurimi?

(a)

1	Yes / Ina	
2	No / E-e	

If Yes / Ina:

(b)

1	Full time / Nkarhi hinkwawo	
2	Part time / Nkarhinyana	
3	Such as / Tanihi	

5.2 CHILDREN / VANA:

	a) Name / Vito	**b) Age / Malembe**	**c) Grade / Gireyidi**	**d) Working / Ntirho**
1				
2				
3				
4				
5				
6				

6 RESIDENCE / VUTSHAMO

1	Town / Doroba	
2	Rural Village / Malayini	
3	Farm / Vurimelo	
4	Other / Swin'wana	
5	What / Hi Swihi ?	

6.1 HOMELESS / KU PFUMALA KAYA

1	Yes / Ina	
2	No / E-e	

6.2 NAME OF COMMUNE/VILLAGE/TOWN / VITO RA NDHAWU/MALAYINI/DOROBA:

_____

7 AGE / MALEMBE …….. (in years)

8 GENDER/ RIMBEWU

1	Masculine/ Xinuna	

2	Feminine/ Xisati	

9 MARITAL STATUS / XIYIMO XA VUKATI

1	Single/ A wu tekangi/tekiwangi	
2	Married/ U tekile/tekiwile	
3	Divorced/ U tharile	
4	Other / Swin'wana	

10 EDUCATION / DYONDZO

1	None/ Ku hava		
2	Highest standard/grade passed / Ntangha/gireyidi ya le henhla leyi u yi paseke :	Grade / Gireyidi	Standard / Ntangha
3	Other qualifications / Tidyondzo tin'wana leti u ti thwaseleke		

11 LITERATE / VUTIVI BYO TIRHISIWA

Languages / Tindzimi	**1 Speaking / Ku vulavula**	**2 Writing / Ku tsala**	**3 Reading / Ku hlaya**
11.1 English / Xinghezi			
11.2 Other / Tin'wana			

II CURRENT EXPOSURE TO COMPUTER TECHNOLOGY / XIYIMO XA SWESWI XA VUTIVI BYO TIRHISA SWA KHOMPHYUTA THEKINOLOJI

12 Availability and exposure to Technology / Ku kumeka na ku tiva ku tirhisa swa Thekinoloji

	1 At home / Ekaya	2 At your job / Entirhweni	3 Elsewhere = Where ? / Kun'wana = Kwihi ?
1. Telephone / Riqingho			
2. Fax / Fekisi			
3. Computer / Khomphyuta			
4. Modem / Modeme			
5. Printer / Printara			
6. E-mail / E-mail			
7. Internet / Inthanete			

8. Typewriter / Muchini wo thayipa			
9. Radio / Rhediyo			
10. TV / TV			
11. Cell phone / Selefoni			

13 Needs for Information and Communication Tools / Swilaveko swa tithulusu ta vuxokoxoko na vuhlanganisi:

(a)

Tool / Thulus	**Purpose / Xikongomelo**				
Equipment / Xingolongo dzwana	1 Social / Swa vaaki	2 Learning / Ku dyondza	3 Doctor/health / Dokodela/rihanyu	4 Work / Ntirho	5 Security / Vuhlayiseki
1. Telephone / Riqingho					
2. Fax / Fekisi					
3. Computer / Khomphyuta					
4. E-mail / E-mail					
5. Internet / Inthanete					
6. Printer / Printara					
7. Photocopier / Muchini wo kopiya					
8. Cell phone / Selefoni					

(b)

Tool / Thulus	**How often / Ka ngani ?**		
Equipment / Xingolongo dzwana	1 Daily / Siku na siku	2 Weekly / Hi vhiki	3 Monthly / Hi n'hwet
1. Telephone / Riqingho			
2. Fax / Fekisi			
3. Computer / Khomphyuta			
4. E-mail / E-mail			
5. Internet / Inthanete			
6. Printer / Printara			
7. Photocopier /			

Muchini wo kopiya			
8. Cell phone / Selefoni			

14 Would you be interested in an office (telecentre) with all these facilities / Xana u nga tsakela ku va eka hofisi (telecentre) leyi nga na switirhisiwa leswi?

1	Yes / Ina	
2	No / E-e	
3	Why / Hikwalaho ka yini	

14.1 Would you be willing to use the Technology at a nominal fee / Xana u ta swi tsakela ku tirhisa swingolongodzwana leswi swa Thekinoloji hi ku hakela mali ya le hans?

1	Yes / Ina	
2	No / E-e	
3	Why / Hikwalaho ka yini	

14.2 The telecentre will be run by the Water Users Association (WUA). Would you mind if somebody from outside the Thabina Irrigation Scheme uses the telecentre? /

Ndhawu ya swa vuhlanganisi yi ta fambisiwa hi va ka Water Users Association (WUA). Xana u nga vilela loko munhu un'wana la nga humiki eka Thabina Irrigation Scheme a tirhisa ndhawu ya swa vuhlanganisi?

1	Yes / Ina	
2	No / E-e	
3	Why / Hikwalaho ka yini	

14.2.1 Conditions: (higher fees, restricted hours, etc.) / Swipimelo: (Tihakelo ta le henhla, tiawara leti pimiweke sw. na sw.)

_____
_____
_____
_____
_____
_____
_____

15 What kind of information do you need (Please circle appropriate code) / I vuxokoxoko bya njhani lebyi u byi lavaka? (Khwatihata laha ku faneleke)

15.1 Farming / Vurimi:

1	How to improve my/our farming / Leswi ndzi nga antswisaka xiswona vurimi bya mina/hina hi mukhuva wihi?
2	Who wants my/our products and where / I mani loyi a lavaka swikumiwa swa mina/hina naswona kwihi

3	Current prices of my/our products / Minxavo ya sweswi ya swikumiwa swa mina/hina
4	Things I need to buy / Swilo leswi ndzi lavaka ku swi xava
5	Weather / Maxele
6	Pesticides & fungicides / Murhi wo dlaya switsotso na xidlaya-swikowa
7	Fertilizers / Manyora/quva
8	When to plant certain crops / Nkarhi wo byala swimilana swo karhi
9	Banking information / Vuxokoxoko bya swa le bangi
10	How to improve my corps / Leswi ndzi nga antswisaka xiswona swimilana swa mina
11	Taxes / Swibalo
12	Other information on farming / Vuxokoxoko byin'wana hi vurimi

15.2 Other information needed / Vuxokoxoko byin'wana lebyi lavekaka

1	Health care / Ku hlayisa hi swa rihanyu
2	Welfare programmes / Minongonoko ya ku pfuna vanhu
3	Education/studies / Dyondzo
4	How to improve my/our business / Leswi ndzi nga antswisaka xiswona bindzu ra mina/hina
5	Available jobs / Mintirho leyi kumekaka
6	Social/current events / Swiendleko swa vaaki/swa nkarhi wa sweswi
7	Books and research studies / Tibuku na mindzavisiso

16 What else would you like to obtain/send information about? /
Hi swihi swin'wana leswi u nga tsakelaka ku swi kuma/kumbe ku rhumela vuxokoxoko hi swona?

……
……
……
……

17 What kind of information do you need/send MOST /
I vuxokoxoko bya njhani lebyi u talaka ku byi lava/ku byi rhumela NGOPFU?

……
……
……
……

18 If you can not read or write, would you like to learn to do this /
Loko u nga koti ku hlaya kumbe ku tsala xana u nga tsakela ku dyondza ku endla swilo leswi?

1	Yes / Ina	
2	No / E-e	

19 Would you like to learn another language – which /
Xana u nga tsakela ku dyondza ririmi rin'wana - rihi?
……
……
……
……

20 What kind of information would you like to give people outside your community /
I vuxokoxoko byihi lebyi u nga tsakelaka ku byi nyika vanhu van'wana lava nga riki vaaka-tiko va ka n'wina?

1	What I am doing / Leswi ndzi swi endlaka
2	What I am selling / Leswi ndzi swi xavisaka
3	What I can do (job) / Leswi ndzi nga swi endlaka (ntirho)
4	Our culture / Ndhavuko wa hina
5	Our social events / Swiendleko swa vanhu loko va hlanganile
6	Other / Swin'wana

21 Do you do business (sell or buy products) with people in /
Xana u endla bindzu (ku xavisa kumbe ku xava swikumiwa) na vanhu eka:

1	Your community / Vaaka-tiko va ka n'wina
2	Neighbouring villages / Malayini lawa mi akelanaka na wona
3	Towns / Madoroba
4	The capital / Doroba-nkulu
5	Other countries / Matiko man'wan

22 If you do not have a telephone, is this because it is /
Loko u nga ri na riqingho, leswi swi hikwalaho ka:

1	Too expensive / Ri durha ngopfu
2	Difficult/impossible to get one / Swa nonohwa ku ri kuma
3	No need / A ri laveki
4	Other reason / Xivangelo xin'wana

23 Do you read books or magazines (Farmer's Weekly, etc) – which /
Xana wa hlaya tibuku kumbe timagazini (xik.: Farmers Weekly) - Hi tihi?

1	Yes / Ina	
2	No / E-e	

(a)
(b) **Publication** **Frequently** **Sometimes**
Buku **Hakanyingi** **Nkarhi wun'wa**

.....		
.....		
.....		
.....		

23.1 If no, Why / Hi kwalaho ka yini ?

1	Cannot read / A ndzi koti ku hlaya	
2	Not interested / A ndzi swi tsakeli	
3	No time / A ndzi na nkarhi	
4	Not available / A ti kumeki	
5	Can not afford it / A ndzi swi koti ku xava	

24 Which newspapers do you read /
Xana u hlaya tinyuziphepha tihi?

Name: **Frequently** **Sometimes**
Vito: **Hakanyingi** **Nkarhi wun'wa**

.....		
.....		
.....		
.....		

25 If you do not – why /
Loko u nga hlayi nchumu - Hikwalaho ka yini ?

1	Not interested / A ndzi swi tsakeli	
2	No time / A ndzi na nkarhi	
3	Not available / A ti kumeki	
4	Can not afford it / A ndzi swi koti ku xava	
5	Cannot read / A ndzi koti ku hlaya	

26 Do you listen to the radio / Xana wa yingisela rhediyo?

1	Frequently / Hakanyingi	
2	Sometimes / Nkarhi wun'wana	
3	Never / A ndzi yingiseli	

26.1 Which Station and Programme do you listen to /
Xana hi xihi xitichi lexi u xi yingisaka ni nongonoko lowu u wu rhandzka ?
.....
.....
.....

27 If you do not – why / Loko u nga yingiseli - Hikwalaho ka yini?

1	Not interested / A ndzi swi tsakeli	
2	No time / A ndzi na nkarhi	

3	Not available / A yi kumeki	
4	Can not afford it / A ndzi koti ku yi xava	
5	No electricity (battery) / Ku hava gezi (tibetiri)	

28 Do you watch TV / Xana wa languta thelevhixini (TV) ?

1	Frequently / Hakanyingi	
2	Sometimes / Nkarhi wun'wana	
3	Never / A ndzi languti	

28.1 Which TV programme do you like most /
Xana hi wihi nongonoko lowu u wu rhandzaka ngopfu ?

……
……
……

29 If you do not, why / Loko u nga languti, hikwalaho ka yini?

1	Not interested / A ndzi swi tsakeli	
2	No time / A ndzi na nkarhi	
3	Not available / A kun a TV	
4	Can not afford it / A ndzi koti ku yi xava	
5	No electricity (battery) / Ku hava gezi (tibetiri)	

30 If you had access to a computer, what would you use it for /
Loko a wu kota ku tirhisa khomphyuta, xana a wu ta yi tirhisela yini?

1	Writing letters, communication (Word processing) / Ku tsala mapapila, ku tsala swin'wana
2	Obtain information on farming (Internet) / Ku kuma vuxokoxoko hi swa vurimi (Inthanete)
3	Correspond with other agriculture-related organisations (e-mail) / Ku tihlanganisa na minhlangano yin'wana leyi fambelanaka na swa vurimi (e-mail)
4	Other / Swin'wana

31 What other sources of information do you need /
Hi swihi swin'wanyana swo kuma vuxokoxoko leswi u swi lavaka?

……
……
……
……
……
……

32 Do you have to travel to another town/village for access to Technology / Xana u suka u ya edorobeni/emalayinini (ndhawu) man'wana leswaku u ta kota ku tirhisa Thekinoloji ?

1	Yes / Ina	
2	No / E-e	

33 Name of village/town/city / Vito ra malayini/muti/doroba/doroba-nkulu

_____

34 Means of transport / Muxaka wa xifambo

_____

35 Distance (km) / Mpfhuka (km) _____

36 Time required one way / Nkarhi lowu lavekaka eka riendzo rin'we

_____

37 Cost of transport / Tihakelo ta swifambo _____

38 Average time spent away from home on these trips (Hours/days/months) / Nkarhi wo ringanela lowu tirhisiwaka loko u nga ri ekaya u ri eka tiendzo leti (Tiawara/masiku/tin'hweti)

_____

39 Would you travel less if you had access in your community to the Technology / Xana mafambelo ya wena a ya ta hunguteka loko a mi ri na Thekinoloji eka vaaka-tiko na muganga wa ka n'wina?

1	Yes / Ina	
2	No / E-e	
3	Don't know / A ndzi swi tivi	

****

11 FUNCTIONALLY LITERATE / VUTIVI BYO TIRHISIWA

Languages / Tindzimi	1 Speaking / Ku vulavula	2 Writing / Ku tsala	3 Reading / Ku hlaya
11.1 English / Xinghezi			
11.2 Other / Tin'wana			

II CURRENT EXPOSURE TO COMPUTER TECHNOLOGY / XIYIMO XA SWESWI XA VUTIVI BYO TIRHISA SWA KHOMPHYUTA THEKINOLOJI

12 Availability and exposure to Technology / Ku kumeka na ku tiva ku tirhisa swa Thekinoloji

	1 At home / Ekaya	2 At your job / Entirhweni	3 Elsewhere = Where ? / Kun'wana = Kwihi ?
1. Telephone / Riqingho			
2. Fax / Fekisi			
3. Computer / Khomphyuta			
4. Modem / Modeme			
5. Printer / Printara			
6. E-mail / E-mail			
7. Internet / Inthanete			
8. Typewriter / Muchini wo thayipa			
9. Radio / Rhediyo			
10. TV / TV			
11. Cell phone / Selefoni			

13 Needs for Information and Communication Tools /
Swilaveko swa tithulusu ta vuxokoxoko na vuhlanganisi:

(a)

Tool / Thulus	**Purpose / Xikongomelo**				
Equipment / Xingolongo dzwana	1 Social / Swa vaaki	2 Learning / Ku dyondza	3 Doctor/health / Dokodela/rihanyu	4 Work / Ntirho	5 Security / Vuhlayiseki
1. Telephone / Riqingho					
2. Fax / Fekisi					
3. Computer / Khomphyuta					
4. E-mail / E-mail					
5. Internet / Inthanete					
6. Printer / Printara					
7. Photocopier / Muchini wo kopiya					
8. Cell phone / Selefoni					

(b)

Tool / Thulus	**How often / Ka ngani ?**		
Equipment / Xingolongo dzwana	1 Daily / Siku na siku	2 Weekly / Hi vhiki	3 Monthly / Hi n'hwet
1. Telephone / Riqingho			
2. Fax / Fekisi			
3. Computer / Khomphyuta			
4. E-mail / E-mail			
5. Internet / Inthanete			
6. Printer / Printara			
7. Photocopier / Muchini wo kopiya			
8. Cell phone / Selefoni			

14 Would you be interested in an office (telecentre) with all these facilities / Xana u nga tsakela ku va eka hofisi (telecentre) leyi nga na switirhisiwa leswi?

1	Yes / Ina	
2	No / E-e	
3	Why / Hikwalaho ka yini	

14.1 Would you be willing to use the Technology at a nominal fee / Xana u ta swi tsakela ku tirhisa swingolongodzwana leswi swa Thekinoloji hi ku hakela mali ya le hans?

1	Yes / Ina	
2	No / E-e	
3	Why / Hikwalaho ka yini	

14.2 The telecentre will be run by the Water Users Association (WUA). Would you mind if somebody from outside the Thabina Irrigation Scheme uses the telecentre? /

Ndhawu ya swa vuhlanganisi yi ta fambisiwa hi va ka Water Users Association (WUA). Xana u nga vilela loko munhu un'wana la nga humiki eka Thabina Irrigation Scheme a tirhisa ndhawu ya swa vuhlanganisi?

1	Yes / Ina	
2	No / E-e	
3	Why / Hikwalaho ka yini	

14.2.1 Conditions: (higher fees, restricted hours, etc.) / Swipimelo: (Tihakelo ta le henhla, tiawara leti pimiweke sw. na sw.)

_____
_____
_____
_____
_____
_____
_____

15 What kind of information do you need (Please circle appropriate code) / I vuxokoxoko bya njhani lebyi u byi lavaka? (Khwatihata laha ku faneleke)

15.1 Farming / Vurimi:

1	How to improve my/our farming / Leswi ndzi nga antswisaka xiswona vurimi bya mina/hina hi mukhuva wihi?
2	Who wants my/our products and where / I mani loyi a lavaka swikumiwa swa mina/hina naswona kwihi
3	Current prices of my/our products / Minxavo ya sweswi ya swikumiwa swa mina/hina
4	Things I need to buy / Swilo leswi ndzi lavaka ku swi xava
5	Weather / Maxele
6	Pesticides & fungicides / Murhi wo dlaya switsotso na xidlaya-swikowa
7	Fertilizers / Manyora/quva
8	When to plant certain crops / Nkarhi wo byala swimilana swo karhi
9	Banking information / Vuxokoxoko bya swa le bangi
10	How to improve my corps / Leswi ndzi nga antswisaka xiswona swimilana swa mina
11	Taxes / Swibalo
12	Other information on farming / Vuxokoxoko byin'wana hi vurimi

15.2 Other information needed / Vuxokoxoko byin'wana lebyi lavekaka

1	Health care / Ku hlayisa hi swa rihanyu
2	Welfare programmes / Minongonoko ya ku pfuna vanhu
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4	How to improve my/our business / Leswi ndzi nga antswisaka xiswona bindzu ra mina/hina
5	Available jobs / Mintirho leyi kumekaka
6	Social/current events / Swiendleko swa vaaki/swa nkarhi wa sweswi
7	Books and research studies / Tibuku na mindzavisiso

16 What else would you like to obtain/send information about? /
Hi swihi swin'wana leswi u nga tsakelaka ku swi kuma/kumbe ku rhumela vuxokoxoko hi swona?

.....
.....
.....
.....

17 What kind of information do you need/send MOST /
I vuxokoxoko bya njhani lebyi u talaka ku byi lava/ku byi rhumela NGOPFU?

.....
.....
.....
.....

18 If you can not read or write, would you like to learn to do this /
Loko u nga koti ku hlaya kumbe ku tsala xana u nga tsakela ku dyondza ku endla swilo leswi?

1	Yes / Ina	
2	No / E-e	

19 Would you like to learn another language – which /
Xana u nga tsakela ku dyondza ririmi rin'wana - rihi?

.....
.....
.....
.....

20 What kind of information would you like to give people outside your community /
I vuxokoxoko byihi lebyi u nga tsakelaka ku byi nyika vanhu van'wana lava nga riki vaaka-tiko va ka n'wina?

1	What I am doing / Leswi ndzi swi endlaka
2	What I am selling / Leswi ndzi swi xavisaka
3	What I can do (job) / Leswi ndzi nga swi endlaka (ntirho)
4	Our culture / Ndhavuko wa hina
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Xana u endla bindzu (ku xavisa kumbe ku xava swikumiwa) na vanhu eka:

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3	Towns / Madoroba
4	The capital / Doroba-nkulu
5	Other countries / Matiko man'wan

22 If you do not have a telephone, is this because it is /
Loko u nga ri na riqingho, leswi swi hikwalaho ka:

1	Too expensive / Ri durha ngopfu
2	Difficult/impossible to get one / Swa nonohwa ku ri kuma
3	No need / A ri laveki
4	Other reason / Xivangelo xin'wana

23 Do you read books or magazines (Farmer's Weekly, etc) – which /
Xana wa hlaya tibuku kumbe timagazini (xik.: Farmers Weekly) - Hi tihi?

1	Yes / Ina	
2	No / E-e	

Publication **Buku**	**Frequently** **Hakanyingi**	**Sometimes** **Nkarhi wun'wa**
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

23.1 If no, Why / Hi kwalaho ka yini ?

1	Cannot read / A ndzi koti ku hlaya	
2	Not interested / A ndzi swi tsakeli	
3	No time / A ndzi na nkarhi	
4	Not available / A ti kumeki	
5	Can not afford it / A ndzi swi koti ku xava	

28 Do you watch TV / Xana wa languta thelevhixini (TV) ?

1	Frequently / Hakanyingi	
2	Sometimes / Nkarhi wun'wana	
3	Never / A ndzi languti	

28.1 Which TV programme do you like most /
Xana hi wihi nongonoko lowu u wu rhandzaka ngopfu ?

.....
.....
.....

29 If you do not, why / Loko u nga languti, hikwalaho ka yini?

1	Not interested / A ndzi swi tsakeli	
2	No time / A ndzi na nkarhi	
3	Not available / A kun a TV	
4	Can not afford it / A ndzi koti ku yi xava	
5	No electricity (battery) / Ku hava gezi (tibetiri)	

30 If you had access to a computer, what would you use it for /
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1	Writing letters, communication (Word processing) / Ku tsala mapapila, ku tsala swin'wana
2	Obtain information on farming (Internet) / Ku kuma vuxokoxoko hi swa vurimi (Inthanete)
3	Correspond with other agriculture-related organisations (e-mail) / Ku tihlanganisa na minhlangano yin'wana leyi fambelanaka na swa vurimi (e-mail)
4	Other / Swin'wana

31 What other sources of information do you need /
Hi swihi swin'wanyana swo kuma vuxokoxoko leswi u swi lavaka?

.....
.....
.....
.....
.....
.....

32 Do you have to travel to another town/village for access to Technology / Xana u suka u ya edorobeni/emalayinini (ndhawu) man'wana leswaku u ta kota ku tirhisa Thekinoloji ?

1	Yes / Ina	
2	No / E-e	

33 Name of village/town/city / Vito ra malayini/muti/doroba/doroba-nkulu

_____

34 Means of transport / Muxaka wa xifambo

_____

35 Distance (km) / Mpfhuka (km) _____

36 Time required one way / Nkarhi lowu lavekaka eka riendzo rin'we

_____

37 Cost of transport / Tihakelo ta swifambo _____

38 Average time spent away from home on these trips (Hours/days/months) / Nkarhi wo ringanela lowu tirhisiwaka loko u nga ri ekaya u ri eka tiendzo leti (Tiawara/masiku/tin'hweti)

_____

39 Would you travel less if you had access in your community to the Technology / Xana mafambelo ya wena a ya ta hunguteka loko a mi ri na Thekinoloji eka vaaka-tiko na muganga wa ka n'wina?

1	Yes / Ina	
2	No / E-e	
3	Don't know / A ndzi swi tivi	

****

25

APPENDIX G Munghana Lonene

Ward C: Munghana Lonene } agric programmes = 1: 015 8123257
①Jacaranda } social " = 2: 012 6739100 = 94.2
Ward A: ③ Radio Tobela: FM = news = 3: 015 2900000 87%
LM Ester 015-2900173
①Jacaranda: very rare 4
② D: Munghana Lonene = 1 Lonnie Magotoga
③Jobela FM = 3
Radio Venda = 5
①Jacaranda = 2
Greater Tzaneen = 6
B: 1.3 Radio 2000 — 7
6

30
5 = Health
6 = Education
7 = weather
8 = Job creation / related matters
9 = current affairs
10 = Store each farmer
Pie en machine

Q31: 1 Health
2 = Education
3 = current affairs
4 = job creation
5 = Communication
6 = weather
7 = Price & market
8 = Store info
9 = where are the markets
10 = ~~Store each farmer [illegible]~~
when to plant what

28: Ward C: Mopani Station = TV2 = local affairs
Ward A: Only sometimes = Farming programmes: 50/50
Ward B: 50/50, news, weather, Ladumma Mopana = TV2

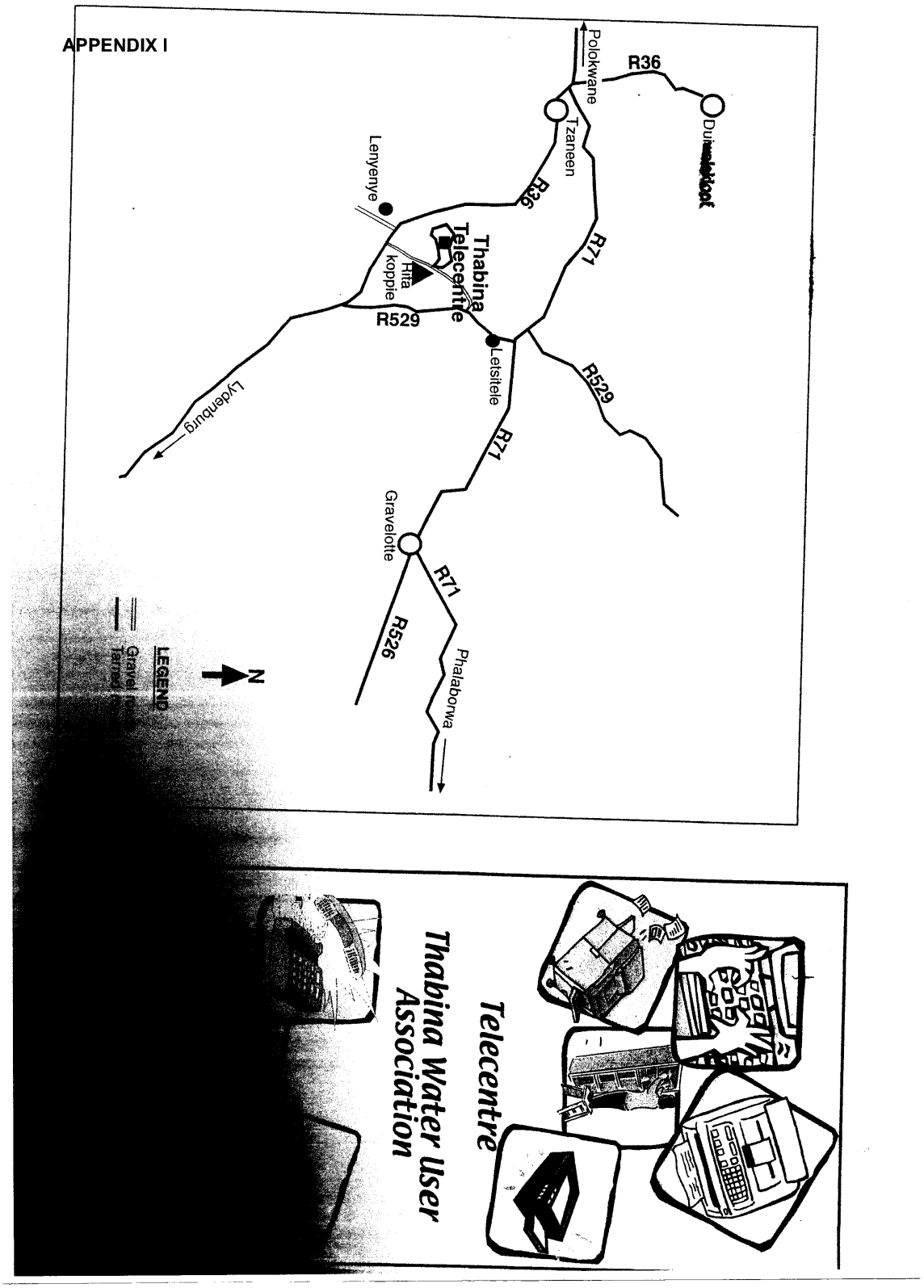
Q33-38: Public transport = taxi

Ward C:	Lenyenye has machines	± [illegible] km	1 hr	R3
	Letsitele	± 10 km	1½ hr	R4.50
	Tzaneen	± 20 km	1 hr	R5.00
Ward A:	Lenyenye	± 3 km	1 hr	R6.24
	Rita	± km	30 min	walk
	Tzaneen	± 25 km	1 hr	R10
		± 12 km	30 min	R4
Ward D:	Letsitele	± 30 km	30 min	R19
	Tzaneen	± 6 km	30 min	R9
	Lenyenye	± 30 km	30 min	R8
Ward B:	Tzaneen	± 10 km	15 min	R5
	Letsitele	± 10 km	15 min	R8
	Nkowa?			

APPENDIX H

	Farmers: B⟶	[redacted] 159
May-01	Total previous payments:	R 0.00
	Arrears:	R 0.00
	This month's premuim:	R 60.00
	Total due:	R 60.00
Jun-01	Payments:	R 60.00
31 June-01	Total previous payments:	R 60.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Jul-01	Payments:	R 10.00
Jul-01	Total previous payments:	R 70.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Aug-01	Payments:	R 10.00
Aug-01	Total previous payments:	R 80.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Sep-01	Payments:	R 10.00
31 Sept-01	Total previous payments:	R 90.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Oct-01	Payments:	R 10.00
Oct-01	Total previous payments:	R 100.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Nov-01	Payments:	R 10.00
31 Nov.01	Total previous payments:	R 110.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Dec-01	Payments:	R 10.00
Dec-01	Total previous payments:	R 120.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Jan-02	Payments:	R 10.00
Jan-02	Total previous payments:	R 130.00
	Arrears:	R 0.00
	This month's premuim:	R 10.00
	Total due:	**R 10.00**
Feb-02	Payments:	R 10.00

APPENDIX I



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aandag: Edna

AAN: TABINA KO-OP
AANDAG: DAISY VAN DER MERWE
FAKS: 012 - 8040753
VAN: DIRK LE ROUX

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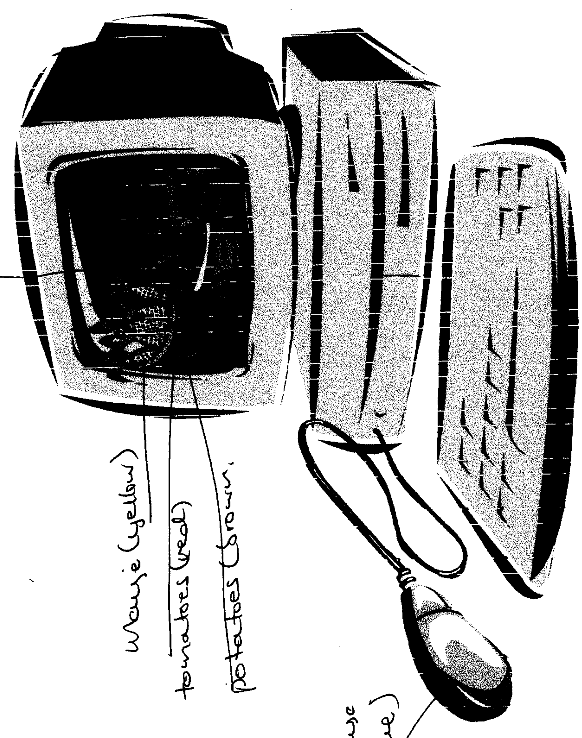
SKORS WALTHAM	50 X 500 G	R6 367.50
SKORS WALTHAM	20 X 1 KG	R4 770.00
PEPPER KING ARTHUR	20 X 1 000 SADE	R7 110.00
OKRA CLEMSON SPINLESS	50 X 100 GR	R 540.00
T/BONE SAVANNAH	50 X 1 KG	R3 000.00
BTW		R3 323.67
TOTAAL		R27 064.17

DIRK LE ROUX
AREABESTUURDER

APPENDIX K

Edwah:
Tel: 015-355-4129
fx: 015-355-3972

"Ednah, Here is a picture in 3dimensional.
- Please show it to the management committee.
Regards, Dau..."



APPENDIX L

PUBLICATIONS FOR TELECENTRE AT THABINA

INFOTOONS (Large calendar sized, existing of drawings and the minimum, easy to understand descriptions in English – all in one):
Be careful of rabies
Chicken farming: The portable unit
Compost: Nature's fertilizer
Controlling fruit flies in subtropical crops
How avocados can be planted
How papayas can be planted
How to get a Land Bank step up loan
How to get a loan from Land Bank
How to get your soil tested
How to grow bambara groundnuts
How to grow beetroot
How to grow cabbage
How to grow carrots
How to grow eggplant
How to grow sorghum
How to grow sweet potatoes
How to grow tomatoes
How to protect your stored grain
Let's grow cucurbits
Let's grow onions
Let's grow potatoes
Let's grow turnips
Making the most of rain water
Mulch: A blanket on the soil
Preparing fresh goat's milk
The cultivation of maize
The lending cycle
The manufacture of goat meat products
The palabana ripper-planter attachment
The safe application of chemicals
The sweet work of bees
The traditional "inspan" of donkeys
The use of soap water in growing vegetables and fruit
The vicious life-cycle of the beef tapeworm
Things to do with plastic bottles
Watch out for hookworm
Watch out for hydated tapeworm
Why keep goats?

BOOKLETS (small booklets, containing sketches and minimum, easy to understand descriptions in English):
Are my chickens healthy?
Brucellosis and tuberculosis
Cabbage production
Chicken care
Chili production
Clostridial production
Common diseases of small pig herds
Cultivating avocados
Cultivating citrus
Cultivating granadillas
Cultivating litchis
Cultivating macadamias
Cultivating mangoes
Cultivating pineapples
Developing agriculture with animal traction
External parasites of cattle
Food preparation and home safety
Foot-and-mouth disease
Garden mealies for six months
Green bean production
Grow healthy vegetable seedlings
HIV/Aids and nutrition
Keeping rabbits
Let's make compost
Making a door garden
Mastitis
My cow is unable to stand up!
Nervous conditions in poultry
Newcastle disease
Parasitic cysts and lesions in meat
Parasitic cysts and lesions in organs
Pig care
Planting vegetables on a compost bed
Poisonous plants
Potato production
Practical egg production
Respiratory diseases in cattle
Respiratory diseases in goats and sheep
Respiratory diseases in pigs
Skin conditions in goats and sheep
Skin conditions in pigs
Sweet white lupine production in the summer rainfall area
Tick-borne diseases in ruminants
Udder and teat lesions

Using kraal manure as a fertilizer
Vegetable production in a nutshell
Why did my animal die?
Zoonotic diseases

LEAFLETS (well illustrated)
Acid soil and lime
African horse sickness
Amaranth
Anthrax
Application of lime
Are my pigs healthy?
Beef cattle: castration
Beef Cattle: dehorning
Beef cattle: legal identification marks
Beef cattle: weaning of calves
Boer goats: mating
Boer goats: breed standards
Breeding in sheep and goats
Brucellosis
Bushveld management
Cactus pear: a plant with many uses
Cashmere – new marketing opportunities!
Cattle (Bovine) tuberculosis
Collect rainwater form your roof
Condition scoring of cattle
Congo fever
Cultivating cowpeas
Cultivation of groundnuts
Farming during a drought
Feeding of sheep and goats
Feeding reproductive sheep and goats
Getting a loan or credit from a commercial bank
Goats
Goats: vaccination programme
Growing chickpeas
Growing lentils
Growing safflower
Hints for dipping sheep
HIV/Aids and the farming community
    Caring for people with HIV/Aids
    Know your rights
    What the farming community should know
    Nutrition
    What women should know
    Stay healthy
Household chickens
How to estimate the age of cattle
How to estimate the age of goats and sheep
How to form a co-operative

How to handle pesticides safely
How to run a meeting
How to store grain
Importation of meat: requirements and procedure
Importation of animals and animal products
Invading alien plants
Johne's disease
Keep chickens
Keeping rabbits
Livestock improvement terminology
Mastitis
Muscovy ducks (makoue)
Pesticides: disposing of empty containers
Pesticides: storing agrochemicals and stock remedies
Rabies
Rules for clean hand milking
Slaughterings and consumer confidence
Small-scale egg production
Soil erosion
Soil potential
Soil sampling
Sorghum
Test your soil
The genetically modified organisms Act, 1997
Tobacco (air-cured)
Vegetable production: manure and other organic fertilisers
Vegetable production: Seedlings in trays
Vegetable production: compost
Vegetable production: mulching
Vegetable production: plan and prepare your vegetable garden
Vegetable production: soil
Vegetable production: sowing seed and planting seedlings
What does the label say?

APPENDIX M

(4)

QUESTIONNAIRE

		Cost
1	**Which facility did you use:**	
	- Telephone	
	- Fax	R10-00
	- Printer	
	- Scanner	R5-00
	- Copier ✓	R5-00
	- Computer ✓	

2 **What did you use it for:**

- social/friends
- Farming information
- education/learning ✓
- doctor/health
- security/emergency
- other

3 **Time spent in telecentre** from 08:00—10hrs

4 **How did you benefit from the telecentre:**

Helped

5 **If you did not have a telecentre, where would you go?** BANEEN

6 **How many km away** ±76 m

7 **How much would it cost** R20-00

8 **Average time it would take** ±2 hours

9. Time: — 2 hrs — — — —

PRICE LIST - NONGONOKO WA MINXAVO / TIHAKELO

Printing (Typing) Ku Pirinta/thayipa	R5 pp R5 pheji
Printing (colour) Ku Pirinta (mihlovo)	R6 pp R6 pheji
Printing (certificates) Ku Pirinta (Tisetifikheti)	R3 pp R3 pheji
Print out from own disk Ku pirinta ku huma eka disiki ya wena	R2 pp R2 pheji
Photocopying Ku fotokhopiya	R2.00 pp R2.00 pheji
Photocopying (colour) Ku fotokhopiya (mihlovo)	R4 pp R4 pheji
Fax Ku fekisa	R3 pp Limpopo R3 pheji eLimpopo
Fax Ku fekisa	R4 pp Other provinces R4 pheji eka swifundza swin'wana
Fax receive Ku amukela fakisi	R2 pp R2 pheji
Scan disk for virus Ku kambela (sikena) disiki ku kuma vhayirasi	R3 p disk R3 hi pheji
Scan picture Ku sikena Xifaniso	R10 pp R10 hi pheji
Computer usage Matirhisele ya khomphyuta	R5 per 30 min R5 hi 30 wa timinete
Internet Inthanete	R5 per 30 min R5 hi 30 wa timinete
Public phone Tifoni ta mani na mani	R0,60 per unit (3 minutes) R0, 60 hi uniti (3 wa timinete)

Ekstra words - Marito yo engetela

Flat bed - Xikenara xo ringanela
Laser printer - Printara ya Lazer
Ink jet printer - Printara ya Ink jet
Colour - Mihlovo
Black and white - Ntima na ku basa

APPENDIX N

DATA FOR INCOMING AND OUTGOING CALLS DURING DECEMBER 2006

Date in December 2006	1	4	6	7	8	11	12	13	14	15	18	19	20	21	22	25	26	27	28	29	Made	Received	made/receive	Mean	Standard deviation
08:00 - 09:00	3	2	2	3	5	6	7	3	5	5	4	3	2	5	3	4	6	7	5	3	83		Made	4.21	1.60
08:00 - 09:00	3	3	2	0	2	0	3	3	4	0	0	5	4	2	2	3	2	2	4	3		47	Received	2.32	1.46
09:00 - 10:00	3	3	2	4	2	4	5	3	5	2	5	4	6	3	5	5	4	4	5	7	81		Made	4.11	1.36
09:00 - 10:00	5	4	4	3	3	4	3	2	4	3	3	3	2	3	2	3	2	3	3	3		62	Received	3.00	0.79
10:00 - 11:00	3	4	4	3	8	3	4	3	5	4	4	5	4	5	4	3	5	3	1	4	79		Made	4.00	1.36
10:00 - 11:00	3	4	3	4	1	3	4	3	2	4	4	3	4	2	3	2	3	2	3	2		59	Received	2.95	0.89
11:00 - 12:00	3	4	5	2	3	3	2	2	3	4	2	3	4	5	6	5	4	4	3	4	71		Made	3.58	1.15
11:00 - 12:00	4	3	2	4	0	5	2	3	6	3	3	3	3	2	3	4	2	3	2	4		61	Received	3.00	1.28
12:00 - 13:00	4	5	4	2	4	4	2	3	4	4	3	3	5	3	4	7	3	4	6	4	78		Made	3.89	1.21
12:00 - 13:00	3	3	4	0	2	3	2	2	4	3	4	3	2	2	4	2	3	3	2	3		54	Received	2.68	0.98
13:00 - 14:00	3	4	3	2	4	2	2	3	2	2	5	4	4	2	3	5	4	5	4	4	67		Made	3.37	1.09
13:00 - 14:00	4	4	3	0	3	4	3	3	1	2	0	2	3	2	4	3	2	4	1	3		51	Received	2.47	1.28
14:00 - 15:00	3	5	2	3	4	4	3	3	4	4	3	4	5	5	5	3	7	6	7	6	86		Made	4.37	1.42
14:00 - 15:00	5	2	3	0	3	2	2	3	5	4	3	5	4	2	3	2	4	3	3	4		62	Received	3.00	1.25
15:00 - 16:00	2	4	3	3	2	4	4	4	7	4	6	6	5	5	4	6	7	7	4	6	93		Made	4.79	1.57
15:00 - 16:00	3	3	2	4	4	2	2	4	5	2	2	3	4	4	3	4	3	2	5	1		62	Received	3.11	1.12
																			Total		638	458			

APPENDIX O

Revitalisation of Smallholder Irrigation Schemes (Resis) program in Limpopo Province

Dr. M. Shaker Pr. Eng CPEng

Introduction

The South African Government's National Guidelines on Agricultural Water Use describes government policy to transfer the management of smallholder irrigation schemes to farmers and to broaden opportunities for multiple uses
of agricultural water to rural communities.

Limpopo Department of Agriculture (LDA) has taken the lead in implementation of this policy by launching a major programme for the Revitalisation of Smallholder Irrigation Schemes (RESIS).

This is a provincial and national flagship programme to combat poverty and joblessness in the rural areas. The Limpopo province has by far the largest number of smallholder irrigation schemes and they are therefore of direct importance to the province's rural economy. If practical implementation methodologies and approaches can be developed during the course of this programme, the value for the rest of the country and indeed, the continent, is significant.

Overall Programme Objectives

While the RESIS Programme targets smallholder irrigation schemes and the surrounding communities, it was recognised from the outset that the programme cannot succeed without stable and sustainable support from government structures. The Programme therefore has two focus areas:

- The participating communities and all the programme activities and methodologies aimed at successful implementation; and
- The Government systems including personnel and the support systems required to support programme implementation and aftercare.

The RESIS Programme is targeting 126 smallholder irrigation schemes in Limpopo Province. RESIS strives at transformation of rural society by enabling rural households to exercise much more control over their daily lives and especially their economic activity.

Further, RESIS strives to maximize benefits to the broader community by addressing community agricultural water needs, water for homestead gardening, animal watering and dipping tanks, and training and support for dryland crop production.

Local organisational development, namely the establishment and strengthening of enterprise management structures, underpin the economic transformation in the rural areas.

A key parallel objective of the RESIS programme is the 'transformation of government service', as reflected in the Integrated Provincial Support Programme (IPSP). In order to support the community participants in a programme of this size, Government must not only

have efficient service delivery systems that work in practice, but it must also have personnel and managers who are sufficiently experienced to enable the systems to function efficiently

RESIS Rollout and Scope

The RESIS rollout programme involves 126 irrigation schemes, each requiring a full four-year period of intervention to complete the RESIS project cycle. All 126 schemes need to be completed within a six-year term. This implies that activities need to run in parallel on all schemes for a couple of years.

The following table indicate a summary of the activities and planning budget for the RESIS Programme

RESIS Financial Summary of Activities

Activity	Description
Facilitation	Scheme revitalization facilitation
Training	Scheme & water management, crop and entrepreneurship training
Aftercare	Aftercare on training
WUAs/institutions	Facilitation and legal establishment of WUAs
Water supply	Bulk water infrastructure
Infield irrigation	Infield irrigation equipment
Access roads	4 km road per village
Rainwater harvesting	100 tanks per village
Stock dam & watering system	1 dam or system per village
Dip tanks	1 tank per village
Dryland	Support for 100 hectare per village
	Total for Planning Budget= R1 086 880 000

Programme Structure

The RESIS Programme is of key importance to the Department and the Province. Therefore, all departmental staff members have been instructed to detail their contribution to the successful implementation of RESIS in their Performance Agreements. Further, specific managers and staff have been assigned key roles in the Programme Management Unit, the Multi-Disciplinary Team and its components.

The Implementation Cycle

The four-year implementation cycle on each scheme consists of the following generic steps:

- Go/ No Go assessment-Water availability and allocation, Economic viability, etc.
- RESIS Introduction: Awareness and buy-in of local leadership and communities
- Pre-Development Survey: Community mobilisation, vision-building and baseline information gathering
- Local Organisational Development: Establishment/confirmation of Management Committee and joint development and agreement on Development Plan
- Farmers and Management Committee Training and Capacity-Building
- Implementation: Market development, agricultural production, infrastructure rehabilitation

- Monitoring and Aftercare
- Evaluation and Refinement

RESIS in 2005: current status

RESIS Programme is being fully integrated into the Department. The RESIS Multi-Disciplinary Team was established in January 2005 and the Programme Management Unit is functional since February 2005.

Forty-six irrigation schemes completed the Pre-Development process in 2004 and a further 35 schemes are introduced in 2005. The balance of 31 schemes will be introduced early in 2006.

The Department has appointed Engineering Service Providers and infrastructure rehabilitation and redesign has already been started on the first forty-six irrigation schemes, and then the others will follow, when their Pre-Development Surveys are complete.

Rehabilitation of irrigation infrastructure in progress

Left and below: Irrigation after completion of rehabilitation

APPENDIX P

Thabina Irrigation scheme (alias)
Thabina Water Users Association
P.O. Box x501
LETSITELE
0885
2007-09-12

To whom it May Concern

Dear Sir/Madam.

As per telephone message relayed to me from the agricultural personnel based at the Thabina Irrigation Project I have the pleasure to respond as follows:

1 Being chairman of the project at Thabina, first and foremost I would like to indicate that a lot of correspondence has gone between ourselves here and the Department of Agriculture regarding the message relayed from the Department of Water Affairs.. All the same as requested by your Department I will capture some of the most urgent needs for farming activities to be resumed at the scheme. They are;

1.1 <u>rehabilitation of the irrigation infra-structure</u>. The irrigation scheme needs some revitalisation in order to make farming activities at the scheme realistic It wa suggested that the following should be given immediate attention.

1.1.1 <u>The main canal</u>. Repair of the source of the canal to enable the flow of water into the Canal. At present very little water

flows into the [illegible] makes it almost

flows into the canal which makes it almost impossible for farmers along the canal to irrigate their plots.

1.1.2 Pollution: As ~~The dumping~~ The canal used by farmers flows through a village settlement and the committee in most of its correspondence suggested that irrigation pipes be placed from the weir ~~irrigation~~ past the settlemet; ~~it~~ (the distance covered would be ± 2 kilometres). This is suggested as a means of protecting the irrigation water from pollution as residents of the settlement referred to above have a tendency of washing their laundry in the canal. Besides pollution the residents have tendencies of diverting water to other channels for personal use. These tendencies make it extremely difficult for farmers on the lower end to irrigate their plots.

1.2 Cleaning and repair of the two night storage dams

As the flow of water in the canal would not cover the whole length and breadth of the scheme two night storage dams have been constructed for water storage especially for use by farmers in wards 3 & 4. (at least wards A & B next to the source of the canal can irrigate directly from the canal but the last two wards can not get sufficient water for irrigation.

1.3 Repair of subsidiary canals used by farmers for irrigation

Some of these canals are in a bad state and need to be repaired. Besides this need more such canals need to be added to facilitate irrigation

2 Pumping of water from along the Thabina River.
When rains are good there is not much need to pump water from the river to augment canal water. But during dry seasons this is an absolute necessity. In the past, pump stations had been installed in the river where water is pumped into the irrigation canal during dry seasons. All these installations have been vandalised over the past three years It is therefore requested, if possible, to reinstall the pumps as well as the electrical appliances which enable water to be pumped into the irrigation canals. There were in all four such pumping points and if these or part thereof could be repaired, irrigation problems would be greatly minimised. However it is suggested that if this is done, security precautions should be put in place to avoid continuous vandalisation of these installations.

3 Other Outstanding necessities at the scheme
If I got the telephone message correctly they are irrigation problems that can be looked into. While other problems at the project that do not affect need the Department of Agriculture to attend to. Indeed besides water problems there are also:
3.1 Grading of the plots to enable easy flow of water when irrigating.
3.2 Fencing in of the farming plots
3.3 Providing of security to prevent theft of produce
All I have included here under this heading are not very urgent issues and ofcourse these would be addressed by the relevant authority

(7)

~~THABINA~~

In ending I would like to give you the occupacy capacity of the scheme as a whole when things are normal.
There are at the moment 232 hectares of irrigable land at the project with the occupacy distribution as follows:

Number of hectares	Number of farmers
1.0	104
2.0	21
3.0	6
4.0	1
5.0	4

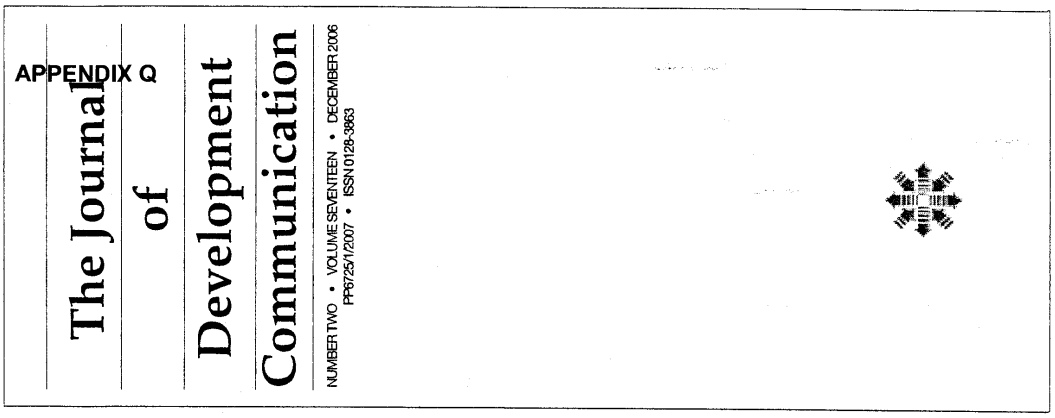
I must however explain that due to the problems explained above the situation is quite different as there are presently not more than 20 farmers on the project.
This committee therefore requests your Department to assist us with what you can and we shall strive to recruit the farmers back to give a 100% occupacy of the available farming ~~go~~ land.

Your cooperation in this regard will be highly appreciated.

D.J. Mtebule
Chairperson.

Under canal

APPENDIX Q



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CONTENTS

APPENDIX S

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

ENQUIRIES:	Mr F.P.J. van der Merwe
TELEPHONE:	336-8245
REFERENCE:	7/18/63/9
DATE:	21 November 2002

Director: Catchment Management

FEEDBACK FROM FIRST EMERGING FARMER WUA: THABINA WUA: LIMPOPO PROVINCE

On Monday 14 October 2002, Mr. van der Merwe, Chief Engineer: Irrigation, visited the Thabina Water User Association (the WUA) near Tzaneen on their request, discussing among others the possibility of financial assistance to them.

As a result of his earlier attendance of several work sessions with these emerging farmers during the past few years, among others during the stage of capacity building and the development of their constitution, among others facilitated by LVA Consultants, the author has acquired a very positive picture of these farmers' willingness to take responsibility for their own destiny.

During the workshop arranged for you by IWMI on 27 September 2002, the Thabina WUA was rightly introduced as the first emerging farmer WUA in South Africa. Already in this workshop we have heard the first reference to Thabina's financial dilemma and their need for the training of their Management Committee (MC) to ensure sustainability.

This need for training of the MC in the different aspects of management, was once more accentuated during the author's visit to Thabina last week. Thanks to the recently established telecentre by the WUA at their offices through the intervention of the Agricultural Research Council, their bookkeeping system is now being kept up effectively on their own computer by a well-trained clerk.

As a result of this bookkeeping system, an analysis of the basic aspects of their financial position could therefore been undertaken for the first time. To everybody's shock, the first analysis revealed that:

- While the WUA's total potential income per month from the water users is R2 310 (R10 per month per plot of 1 ha for 231 plots), their monthly expenditure on fuel for pumping alone amounts to an average of R3 300. Other expenses are their Eskom bill (also for pumping), the salary of the administrative clerk and maintenance to their canal and fences, which was estimated at another R2 500 per month.

- To worsen the matter, the arrears on this already scanty charges are increasing at a rather alarming rate (see Table 1), which perhaps give an indication of the financial position of the average individual farmer on the scheme.
- It indicates that the WUA is at the present rate, not economically viable at all, which means that something should be done right away to help them in an effort to prevent them from going under financially.

  One suggestion to tackle this problem of economic viability, is to appoint Prof. Silvain Perret of the University of Pretoria (who also gave a presentation at the CCSIS meeting of 22 October 2002) to apply his newly developed agricultural economic model, named 'SMILE', on the Thabina WUA. This model is addressing the typical scheme-orientated case that we find among the future emerging farmer WUAs. It could possibly lead to answers for the existing problematic cases, like Thabina. *Budgetary funding may possibly be available for such an exercise*. If this proves to supply useful answers in the case of Thabina, it could be extended to some similar cases in the near future.

Table 1: Increasingly rising state of arrears at Thabina WUA

Date:	**Amount in arrears by water users:**	**Percentage for interim period:**
May 2001 (introduction of charges)	–	–
January 2002 (after 9 months)	R2 960	14%
October 2002 (after 18 months)	R10 620	37% and rising sharply

The arrears on the farmers' side that are rising at such a rate, should be taken notice of, because this tendency could be an indication of a more deep-seated problem, which should be addressed satisfactorily before the other WUAs that are presently being established, follow the same way.

When this undesirable situation came to light, the vice-chairperson of the Thabina WUA, Mr. Ben Mashele, admitted that the Management Committee:

- *Is actually disillusioned with the financial position that developed on their scheme, because they now suspect that Government has talked them into forming a WUA in order to get rid of its financial burden, and now the WUA has to cope without adequate financial assistance. They realise that all their expenses like fuel and electricity for pumping, scheme administration, canal maintenance and fencing costs, which were previously paid by the then Northern Province Department of Agriculture, have to be carried by themselves now, and it has become a serious debt trap to them. THEY HONESTLY FEEL THAT THEY WERE BETTER OFF BEFORE THE WUA HAS BEEN ESTABLISHED.*
- *Needs training urgently on how to manage the WUA, which includes general and portfolio-orientated training, as well as scheme and agricultural management. The last training they got, was about two years ago from LVA, but that is now already long forgotten.*

These opinions were purposefully conveyed exactly as it was expressed to Mr. van der Merwe, in order to paint the picture as it is seen from the side of the WUA. We should therefore prepare ourselves to take steps to turn around the perception of the Thabina WUA, and also pro-active steps to prevent this from becoming a general tendency among new WUAs that will be formed in the near future.

A recommendation therefore is that we once more have a serious look at our own process, and in co-ordinating with the other concerned departments, on:

1. An budgetary allocation on the *efficient facilitation* on preliminary capacity building and institutional training.
2. An adequately designed system of *financial assistance* for these different needs, especially for determining economic viability and for assistance during the first few years of existence of a WUA.
3. A well-balanced and *continuous training programme* on the different institutional, agricultural and water management aspects.
4. Facilitation, and in some cases financial assistance by Government on the establishment and maintenance of certain *key support services*, like:
    - Agricultural *extension.*
    - Easily *accessible information* on crucial farm and water management aspects like daily market prizes, crop production factors like pest control, fertilizers and availability of irrigation water throughout the season.
    - Availability of efficient and affordable *ploughing contractors* and *transportation* to the markets.

It is true that these aspects have been raised many times in the past, and we should now ensure that it is taken up in the programmes that we are currently developing for sustainable development of WUAs.

May we discuss the possible appointment of the mentioned agricultural economic consultant for the Thabina WUA in this regard?

(PF Pretorius)

Director: Water Utilisation