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**WATER SUPPLY AND QUALITY OF LIFE IN RURAL
SETTLEMENTS: AN ANTHROPOLOGICAL
APPROACH**

by

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This anthropological focus on the Swazi residents of two rural settlements in the Nsikazi district (Mpumalanga) contributes to an understanding of the water utilisation practices of rural residents. These practices result from the current state of their settlements' water supply. The effect of utilisation practices on residents' perception of quality of life was also examined.

The study provides an overview of the role and function of local government bodies in residents' daily water supply and of the role of these institutions in developing and maintaining water supply systems. The study gives a detailed account of the functioning of water utilisation facilities used by residents on a daily basis.

The study is based on the realities faced by rural residents who suffer from inadequate daily water supply. The inadequacy of the water supply was found to be due to factors caused both by water suppliers and the residents themselves.

List of key terms:

- Water supply
- Quality of life
- Rural settlements
- Water utilisation practices
- Local government bodies
- Water utilisation facilities
- Swazi residents
- Nsikazi district
- Development
- Maintenance

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SUMMARY

WATER SUPPLY AND QUALITY OF LIFE IN RURAL SETTLEMENTS: AN ANTHROPOLOGICAL APPROACH

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The study focuses on the Swazi residents of two rural settlements, Makoko and Phameni, in the Nsikazi district in Mpumalanga. The study contributes to an understanding of the water utilisation practices of rural residents. These practices are the result of the current state of their settlements' water supply. The effect of these utilisation practices on the residents' perception of their quality of life was also examined.

The study provides an overview of the role and function of local government institutions in residents' daily water supply and also of the role of these institutions in the development and maintenance of water supply systems. The study gives a detailed account of the functioning of the water utilisation facilities used by the residents of Makoko and Phameni on a daily basis.

The study is based on the realities faced by rural residents who suffer from inadequate daily water supply. The inadequacy of the water supply was found to be due to factors caused by both the water suppliers and the residents themselves. The residents' conviction that their inadequate water supply has a negative influence on their quality of life, increases understanding for the perception that the government is responsible for improving their quality of life.



OPSOMMING

WATEROORSIENING EN LEWENSKWALITEIT IN LANDELIKE NEDERSETTINGS: 'n ANTROPOLOGIESE BENADERING

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Die studie fokus op die Swazi inwoners van twee landelike nedersettings, Makoko en Phameni, in die Nsikazidistrik in Mpumalanga. Die studie dra by tot 'n beter begrip van die waterverbruikaktiwiteite van landelike inwoners. Hierdie aktiwiteite word veroorsaak deur die huidige stand van hierdie nedersettings se watertoevoer. Die uitwerking van hierdie verbruikspartone op die inwoners se siening van hulle lewenskwalityeit is ook ondersoek.

Die studie bied 'n oorsig van die rol en funksie van plaaslike regeringsliggame in die inwoners se daaglikse watervoorsiening en ook die rol wat hierdie liggame speel in die ontwikkeling en onderhoud van watervoorsieningstelsels. Die studie bied 'n gedetailleerde weergawe van die werking van die waterverbruikaktiwiteite wat daaglik deur die inwoners van Makoko en Phameni gebruik word.

Die studie is gebaseer op die werklikhede van daaglikse onvoldoende watervoorsiening wat elke dag deur landelike inwoners verduur word. Die faktore wat tot onvoldoende watervoorsiening lei, word veroorsaak deur beide die watervoorsieners en die inwoners self. Die inwoners se oortuiging dat hul watertoevoer hul lewenskwalityeit negatief beïnvloed, bied insig rakende hul oortuiging dat die regering verantwoordelik is vir die verbetering van hul lewenskwalityeit.

2.5 THE LAND TENURE SYSTEM IN MAKOKO AND PHAMENI



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ACRONYMS USED IN THE TEXT

BEC	Branch Executive Committee
C-MIP	Consolidated Municipal Infrastructural Programme
DC	District Council
DWAF	Department of Water Affairs and Forestry
GNP	Gross National Product
HDPE	High density polyethylene



LC	Local Council
LEDC	Lowveld and Escarpment District Council
MC	Metropolitan Council
PSC	Project Steering Committee
RC	Representative Council
RDC	Reconstruction and Development Committee
RDP	Reconstruction and Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation

MAPS

MAP 1	Republic of South Africa
Map 2	Province of Mpumalanga
Map 3	Nsikazi district in Mpumalanga
Map 4	Makoko settlement in the Mdluli Traditional Authority
Map 5	Phameni settlement in the Mdluli Traditional Authority

CHAPTER ONE

RESEARCH GOALS AND METHOD

1.1 INTRODUCTION

“It is vital that all parties involved in efforts to improve community water supply – government agencies, donors, advisors, community leaders, and residents – recognize and adhere to the principle that *it is the local people themselves, not those trying to help them, who have the most important role. The community itself must be the primary decision maker, the primary investor, the primary maintainer, the primary organizer, and the primary overseer*”

(Briscoe and De Ferranti 1988:1)(researcher’s emphasis).

This sentiment is echoed by the South African Government’s policies established after 1994:

“The need for development to be a people driven process is fundamental. There is wide international experience that confirms the view that the provision of services in poor communities will fail if the people themselves are not directly involved. The policy is designed to ensure that the local community controls the process [of developing basic water services] through existing Local Authorities...”

(Department of Water Affairs and Forestry, 1994:6,29).

The concept of community participation in water development projects in rural areas is new in South Africa and the introduction of the concept is part of the current political transition process in the country.

Therefore, for water supply development projects to be successful in South African rural areas, it is of paramount importance to gain sufficient knowledge of the nature of current water supply in rural areas, the influence thereof on rural people’s lives, the nature of

future water supply development projects and the possible influence thereof on the lives of the rural communities concerned.

1.2 RESEARCH GOALS

The primary goal of this study is to give an account of the current realities of a selected South African rural settlement in terms of its present and future water supply in order to determine what the best scenario for water service development will be for this particular settlement.

In order to achieve this primary goal, the following research goals were set:

- to determine the role of local government councils in water provision in rural areas, thereby determining the importance of the local residents' co-operation in their own water development projects;
- to give an account of the residents' water utilisation practices, thereby outlining the daily routine formed around tasks focused on water utilisation;
- to understand how current water supply influences the quality of life of the people living in the study area and what the effect of improved water supply will be on their future quality of life; and
- to determine the residents' value judgements concerning water as a natural resource and water supply as a service.

1.3 THE RESEARCH AREA

For the purposes of analysing a rural settlement in terms of the research goals, the settlement of Makoko within the Mdluli Tribal Area of the Nsikazi district in Mpumalanga was chosen (see Map 2 and Map 3). The Phameni settlement in the Gutswa Tribal Authority area in Mpumalanga was used as a control group.

Makoko is situated in the Lowveld of Mpumalanga to the south of Hazyview approximately at longitude 31°14' east and latitude 25°13' south. The northern and eastern boundaries of the Makoko settlement are formed by the Kaapmuiden-Phalaborwa railway line, which separates the settlement from the western boundary of the Kruger National Park. The southern boundary of the Makoko settlement is a gravel road that leads to the settlement of Malekutu, situated ± 5 km south of Makoko. Makoko is divided into three zones, called Makoko A, Makoko B and Makoko C.

Makoko is situated in a sub-tropical climatic zone with an average rainfall of 650 to 700 mm per annum. Rainfall occurs primarily during the summer months. A non-perennial river, the Nsikazi River, lies about 2 km north of Makoko. The residents of Makoko have access to groundwater by means of one hand pump and two diesel pumps located within the settlement (see Section 3.2.3 for more detail). The residents also receive water from the Sabi River by means of a bulk water reticulation system (see Section 3.2.1 for more detail).

The settlement of Phameni, which forms part of the Gutswa Tribal Authority Area, is located about 3 km northwest from Makoko and was used for control purposes to test research findings (see Chapter Three). The aim was to compare the findings on water utilisation practices among the residents of Makoko with the practices of the residents of Phameni. Therefore, Chapter Three discusses details on the residents of both Makoko and Phameni, while Chapters Two and Four refer mainly to detail on Makoko's residents only. The residents of the two settlements share the same culture (see Section 2.3) and horticultural practices¹. The water supply status of both settlements is very similar. The only differences between the two settlements are that they fall under the jurisdiction of two different Swazi chiefs (*tikhulu*) (see Section 2.3) and that Phameni's population is smaller than that of Makoko. Phameni has a population of approximately 2 200 and

¹ The term "horticulture" is used instead of "agriculture" when referring to the practice of vegetable cultivation of the residents of Makoko and Phameni because of the small yield.

Makoko one of approximately 5 600 (Makoko Needs Assessment 1996:2; Phameni Needs Assessment 1996:2).

1.4 THEORETICAL DEFINITION OF THE RESEARCH THEME

1.4.1 Water as a natural resource

According to Rautenbach (1973:137), renewable natural resources include fauna, flora, air, soil and water. The term “renewable natural resources” refers to resources that can be renewed by nature. These resources stand in contrast to resources such as minerals and oil that, once used by man, cannot be renewed (Fuggle 1992:2-3).

Despite nature's ability to replenish the earth's water supply, water is scarce and valuable in South Africa in general but also in the research area in particular. According to the South African government's *White Paper on Water Supply and Sanitation* (Department of Water Affairs and Forestry 1994:34-35), South Africa is a semi-arid country with limited water resources and with an average annual rainfall of 500 mm, which is only 60 % of the average rainfall across the world. The average annual potential evaporation in South Africa is between 1 100 mm and 3 000mm. Due to high evaporation losses from dams in South Africa, only 62% of the average annual runoff can be used cost-effectively with present technology (Department of Water Affairs and Forestry 1994:34-35)

Due to the dwindling of surface water resources in South Africa, groundwater is becoming a more important water source in the country (Department of Water Affairs and Forestry 1994:34). However, only 5 400 million m³ of water per annum is obtained from underground water sources. A problem hampering the use of groundwater is the uncertainty of its location versus its potentially continuous supply from boreholes. This is mainly due to insufficient knowledge about the characteristics of groundwater sources. Consequently, the Department of Water Affairs and Forestry (DWAF) has embarked on a groundwater characterisation and mapping programme for the whole country (Department of Water Affairs and Forestry 1994:34) which is still underway.

The potential for the use of groundwater in the Nsikazi district, where the research for this study was conducted, is low. The geology of the area causes groundwater to be a poor source for continuous water utilisation (Development Bank of Southern Africa 1985:9-10). Furthermore, only two rivers in the Nsikazi District where Makoko and Phameni are located are perennial, namely the Crocodile and the Sabi Rivers (Development Bank of Southern Africa 1985:9-10).

1.4.2 Sustainable utilisation and development

It is obvious that *sustainable* utilisation of water in South Africa is vital. According to Makombe (1993:12) sustainable utilisation means that the resource must be utilised in such a manner as to grant the resource optimum time to renew itself through a natural process, to the level where it can support a healthy ecosystem. To achieve sustainable utilisation, sustainable development must be practised. According to Allen (1980:24), sustainable development is “development that is likely to achieve lasting satisfaction of human needs and improvement of the quality of human life”. The concepts sustainable utilisation and sustainable development will be discussed in later sections of the study.

1.4.3 Water supply development: community involvement

The need for the development of a sustainable water supply in the researched settlements once again emphasises the concept of sustainable development. Development focused on sustainable utilisation of water entails, amongst other things, the long-term successful usage and maintenance of water supply facilities.

Briscoe and De Ferranti (1988:9) outline the different roles that consumers and governments play in water supply development:

- Consumers must decide on the improvements to be made.
- Consumers must pay most of the cost of the chosen services.
- Consumers must take responsibility for maintaining the facilities they have chosen.

- Governments and external agencies must establish the environment in which communities can construct, operate and manage improved water facilities.

These four guidelines for the successful development of a water supply infrastructure were arrived at through experience gained from water supply development projects undertaken in African countries such as Kenya, Tanzania and Malawi (Briscoe and De Ferranti 1988:9).

In **Kenya**, a government-centred, top-down strategy for the development of a water supply infrastructure proved to be unsuccessful (Briscoe and De Ferranti 1988:9). In the 1960's, the Kenyan government designed and constructed new water supply infrastructure for rural settlements. All the costs of the construction and maintenance of the new infrastructure were met from central government funds, in other words, from "outside the settlements". There was little or no community involvement during the planning, construction and later maintenance of the water facilities. The only role that the residents of the settlements had to play was to receive and utilise the water. The infrastructure for the water supply could, however, not be adequately maintained, due to the unsubstantial nature of the subsidies. Subsequently, the new water facilities soon stopped operating (Briscoe and De Ferranti 1988:9).

A community-based strategy for the provision of water and the construction of a delivery infrastructure, also in Kenya, proved more successful. Government policies which made land available to small farmers and guaranteed high prices for cash crops resulted in steady incomes in rural households. The Kenyan government furthermore encouraged the activities of private groups in community development projects. As a result of these government policies encouraging community participation in development, the residents of the rural settlements concerned developed their own water schemes and infrastructure, which they improved over time and which resulted in a more reliable rural water supply in those areas of Kenya where the programme was implemented (Briscoe and De Ferranti 1988:9).

In **Tanzania**, a government-centred approach also failed when the government agencies responsible failed to deliver the financial and technical support they were supposed to provide for the maintenance and operation of water supply facilities. Unlike in Kenya, no community-based systems developed when government-centred water development projects failed. Reasons for this include the fact that Tanzania's government policies did not support private sector initiatives to develop such infrastructure, as the government policies of Kenya did (Briscoe and De Ferranti 1988:9).

In the case of **Malawi**, government policies established after independence dictated that rural communities would develop primarily by means of self-help activities, supplemented by technical support and training from government departments where necessary. Malawi's Department of Community Development involved the relevant settlements' residents in the planning, construction and operation and maintenance of water supply systems. The result was highly successful water supply schemes, owned, built and maintained by the residents of the settlements concerned, providing them with a reliable water supply (Briscoe and De Ferranti 1988:9).

Against the background of these examples from other African countries, it becomes important to ask why it seems necessary for South African rural communities to take responsibility for the initial construction and continuous maintenance of their own water supply, given that this is not the case with city dwellers. Answers to this question can be found in different aspects of water supply.

First, National Governments are responsible for the overall water supply in their countries, for the development of water facilities and for ensuring that there is adequate water for all citizens (Department of Water Affairs and Forestry 1994:2). However, it is not the National Government's responsibility to manage local water supply systems but that of Local Government (Department of Water Affairs and Forestry 1994:7-9).

Second, in rural areas the tax base that can be created is inadequate and local authorities therefore experience great difficulty in installing and maintaining water supply systems (Department of Constitutional Development 1998: 26, 61).

The development and maintenance of water supply systems in rural areas all over the so-called developing world therefore focus on community participation in construction and maintenance because national and local government simply do not have adequate finances to take responsibility for such services. The same principle also applies in South Africa (Department of Water Affairs and Forestry 1994:7).

1.4.4 Quality of life

The issue of the improvement of the quality of life of rural people in the developing countries of the world has become increasingly multi-dimensional over the past few decades.

Atte (1983:26) states that “the growing urban problems due to rural-urban migration and the threat it poses to various power groups, rather than any major concern for the rural dwellers, are the cause of the present stampede to develop rural areas”.

From this conviction stemmed the economic growth approach and the modernisation approach aimed at improving the quality of life of rural populations in developing countries. The **economic growth approach** has failed in its aim because, in spite of tremendous growth in the GNP of some developing countries, the life of rural people has not changed and indeed has generally deteriorated (Atte 1983:29).

To address the repercussions of the failure of the economic growth approach, the so-called **modernisation approach** was developed (Atte 1983:29). Modernisation in this context refers to a process of social change in which development is the economic component. This implies that modernisation “produces the societal environment in which rising output per head is effectively incorporated” (Atte 1983:29).

Developing countries which embraced the modernisation approach concentrated on building schools, health centres and better housing because “being modern meant to endeavour to consume goods and services of the type manufactured in advanced [sic] industrial countries” (Mabogunje 1980:39). Thus, modernisation has created new needs

and desires among the people exposed to it. The consumption of “modern” goods and services has created considerable disaffection with so-called traditional conditions in rural areas (Mabogunje 1980:39). The modernisation approach to improve the quality of life of rural people consequently succeeded only in intensifying rural-urban migration with increased impoverishment to those left behind in the rural areas (Mabogunje 1980:39).

Atte (1983:30) ascribes the failure of both the economic growth approach and the modernisation approach to the problem of defining quality of life. Attempts to define the concept “quality of life” raise questions about what the standard is by which current living conditions in rural areas are measured, and what level of quality is found “acceptable”. The question is also who decides on this standard – the planner or the people planned for; and at what point quality of life is perceived to be satisfactory (Atte 1983:30).

Due to the problem of defining quality of life, early attempts to improve quality of life followed a colonial schema, called the *etic* approach to enhancing quality of life (Atte 1983:30). In colonial times, colonialists compared living conditions in colonial territories with those of their home countries and concluded that the living conditions of various colonies’ indigenous populations were “inferior”. These colonialists also concluded that this “inferiority” was due to a perceived educational, religious and technological “underdevelopment”. Attempts to improve living conditions therefore focused on raising the living conditions of the indigenous populations to “acceptable levels” and thus to a standard of a better quality of life. Atte (1983:30) further states that most planners in developing countries assimilated such neo-colonialist schemes (economic growth and modernisation approaches) in their development approaches.

Fortunately, in recent times, more successful approaches to improve the quality of life of rural people have been developed. One of these approaches is the basic needs approach. The basic needs approach is supported by the World Bank and it seeks to meet the basic needs of the entire population of a developing country (Atte 1983:30).

This concept of basic needs entails (Streeten and Burki 1978):

- basic consumption goods – food, clothing and shelter – to which everyone is entitled;
- basic services – such as education, health services, clean water supply – to which everyone should have access; and
- the right to participate in making and implementing decisions which affect one’s own development.

Atte (1983:31) adds to the above criteria the provision of productive employment as a means of income, which can be used to purchase basic goods and services, while Ghai *et al.* (1977:12) state that the main principle of the basic needs approach is the recognition that each human being, simply because of his/her existence “has inalienable human rights regarding the satisfaction of basic needs”.

Atte (1983:31) recognises the fact that people from different geographical regions and different cultures have different basic needs to sustain life. Therefore, in order to make the basic needs approach more holistic in nature, three levels of basic needs are proposed which must be met for the approach to be successfully implemented (Atte 1983:31):

- basic survival – having enough to survive;
- continued survival – having the required minimum of food and water; protection from fatal diseases, and adequate shelter; and
- productive survival – having more food, better shelter, and other social services backed by an adequate income.

Atte (1983:31) subsequently promotes an *emic* approach through which rural people can propose their own basic goods and services designed to satisfy their own yearnings. The *emic* approach thus represents a participatory approach, whereby those concerned aid government in defining the current quality of life in rural areas as the rural people perceive it and jointly build a “standard” which will benefit such rural people. According to Atte (1983:32), such an approach is the most successful due to the existence of what he refers to as “a rural ideology”. A rural ideology entails the way of life that a given rural population has built up over time. Consequently, the rural people themselves are in the best position to say whether they are satisfied with their perceived quality of life or not.

Therefore rural people's perception of the enhancement of their quality of life must be the nexus of all development projects, because it is only when their desires are effectively met that they will be satisfied (Atte 1983:32). The desired quality of life results from past experiences and current awareness levels of individuals or specific groups of people (Atte 1983:32).

These above-mentioned approaches to determine quality of life of rural people makes it clear that for the purposes of determining the quality of life of the residents of Makoko and of applying this to development approaches, it is necessary to elicit the residents' own rendition of what quality of life entails for them.

1.4.5 Value judgements

According to Coertze (1980:45), a system of value judgements in a particular culture is established over generations and is conveyed to succeeding generations by means of the process of enculturation. Coertze (1980:45) classifies values in four categories:

- logical values (*logos*) – the factual and logical evaluation of all phenomena in the reality that is relevant to life;
- moral or ethical values (*ethos*) – the good or bad, right or wrong of actions;
- aesthetic values (*aisthesis*) – that which appeals to emotion, appreciation, adoration and satisfaction; and
- pragmatic values (pragmatism) – the evaluation of the usefulness of phenomena with a blissful existence in mind.

Coertze (1980:46) also states that values are culture-specific, since no-one is a fulfilled person outside the context of his/her culture and it is the values of a particular cultural group that form a foundation and link between the different aspects of that particular culture.

The four categories of values originate from a cultural subjective judgement on the truth of reality and are interpreted in terms of an accumulated knowledge system that over generations becomes part of a particular way of life (Coertze 1980:45). This means that the actions of each member of a specific cultural group must be acceptable in terms of the system of values of the whole cultural group.

According to Kriel (1992:14) and to Kearney (1984:41-106), the similarity between the values of members of a cultural group stems from a shared world view, which in turn is the background against which values of reality are formulated. It is also important to point out that different cultures that are related to each other, for example, the south-eastern Bantu cultures, can often share a similar value judgement about a given reality (Coertze 1980:98-99).

Mbiti (1969:108) best describes the general Afro-centric value placed on the family unit when he states: "Whatever happens to the individual happens to the group, and whatever happens to the whole group happens to the individual. The individual can only say: 'I am, because we are; and since we are, therefore I am.'" Macnamara (1980:20), Oruka (1987:24, 57-57) and Landro (1989:136-137) use similar descriptions.

According to Kriel (1992:16), the world view, and therefore also the values of any given culture, changes with extreme difficulty and seldom entails more than just a shift in emphasis because value judgements are the directing and integrating driving force behind the thoughts and actions of people from different cultures.

1.5 RESEARCH METHODOLOGY

The research for this study and the finalising of the study were completed in two years (1997 to 1999). The research included a literature study on the topic as well as quantitative and qualitative field research done within the two research settlements, Makoko and Phameni. Altogether, the quantitative and qualitative field research was done in 18 weeks in periods varying from one week to eight weeks at a time. The quantitative field research entailed the completion of structured questionnaires by a

representative sample of the residents of the Makoko and Phameni settlements. The qualitative research entailed the researcher having interviews with chosen spokespersons.

The research process was undertaken in terms of Coertze's (1978:10) suggestions. It entailed the following processes:

- formulating the proposal;
- designing the research methodology; and
- practising specific research techniques (quantitative and/or qualitative research).

The difference between quantitative and qualitative research was understood in terms of the exposition by Mouton and Marais (1989:157), who state:

“... die *kwantitatiewe benadering* [kan] breedweg beskryf word as daardie benadering in geesteswetenskaplike navorsing wat meer geformaliseerd, sowel as eksplisiet gekontroleerd is [byvoorbeeld statistiese opnames], met 'n reikwydte wat meer presies afgebaken is en relatief na aan die natuurwetenskappe se benadering geleë is. Hierteenoor is die *kwalitiewe benaderings* daardie benaderings waar van die prosedures nie so streng geformaliseer en geëkspliseer is nie, terwyl die reikwydte meer grensloos is en op 'n meer filosofiese wyse te werk gegaan word”

“ the quantitative approach [can] be broadly described as that approach in research in the human sciences that is more formalised, as well as explicitly controlled [for example statistical surveys], with a scope that is more precisely delimited and is relatively close to the approach of the natural sciences. By contrast, qualitative approaches are approaches where some of the procedures are not so strictly formalised and explicated, while the scope is less limited and a more philosophical approach is followed.”

(Mouton and Marais 1989:157) (italics in original).

Coertze's (1978:18-19) instructions in terms of the technique and procedures involved in in-depth interviews were also followed. The techniques and procedures for quantitative research (a statistical survey based on the drawing and completion of questionnaires), as set out by Mitchell (1980), Casley and Lury (1987), Schnetler (1989), Stoker (1989), Mouton and Marais (1989) and Schlemmer (1990) were followed as far as possible.

According to Mouton and Marais (1989:196), the quality of the research findings is directly dependent on the justifiability of the research method followed. Consequently, details on the water utilisation patterns and residents' value judgements on the issues under investigation are described in the chapters of this study as these patterns and value judgements were conveyed to the researcher by spokespersons based on their own perspectives and cultural background as well as within the confines of their value judgements as shaped by their realities. This method of conducting research and of giving an account of the research findings is known as the *emic* approach (Kottak 1987:30).

According to Howard and Dunaif-Hattis (1992:4), the *emic* approach is the best method for conveying people's value judgements on the environment in which they live and the practices involved in their everyday life as formed by the natural environment. Therefore, all statements by spokespersons reflected in this study originate from their own knowledge and insights. However, the researcher accepts responsibility for the presentation of all the facts mentioned and the conclusions arrived at in this study.

1.5.1 Literature study

The first goal of this study was to gain information on the history of the Mdluli people living in the Mdluli tribal area in the Nsikazi district. A book by Van Warmelo (1935), *A Preliminary Survey of the Bantu Tribes of South Africa*, was the main source used to determine the ethnic history of the Mdluli people. A report by Van der Merwe, *Preliminary Ethnological Report* (Van der Merwe 1992) verifies the older information of

Van Warmelo (1935) about the ethnic history of the Mdluli people through interviews with Mdluli spokespersons.

A book by Mabuza (1983), *KaNgwane: The Road Ahead*, proved very useful in explaining the history of Swazi people's residence in South Africa and their relation to Swaziland.

The topic of this study also necessitated research on the role and functions of local government institutions in water supply and water supply development. This included research on the water utilisation practices of this specific cultural group as well as on these people's value judgements regarding water as a natural resource and water supply as a service. Finally, this study involved research on the residents' perception of their quality of life as influenced by the status of their water supply.

For information on the role and function of local government institutions in water supply to rural areas, official South African government documentation proved to be the most useful. All government White Papers quoted in this study were published after the general election of 1994 and therefore represent the policy of the current government. However, it is possible that there were policy changes made after the period in which this study was done.

The *White Paper on Water Supply and Sanitation* (Department of Water Affairs and Forestry 1994) compiled by the Department of Water Affairs and Forestry (DWAF) proved very useful in discovering the policy of the current government regarding basic water supply to the rural population of South Africa. The White Paper contains the Reconstruction and Development Programme's (RDP) minimum standard requirements for water supply that every South African citizen is entitled to (see Section 2.9.6). This White Paper furthermore emphasises the government's policy that the development of water supply infrastructure is to be a people-driven process, and outlines the institutional framework proposed for developing and maintaining such services (see Section 2.9).

When the researcher started with this study, DWAF officials stated that the *White Paper on Water Supply and Sanitation* of 1994 is the correct source of information on the government's policy regarding water supply. During the course of the study, the *Water Services Act* (Republic of South Africa 1997) and the *National Water Act* (Republic of South Africa 1998) was published. For the sake of completeness, references to the *Water Services Act* (Republic of South Africa 1997) and the *National Water Act* (Republic of South Africa 1998) are included in the text where relevant.

The *White Paper on Local Government* (Department of Constitutional Development 1998), compiled by the Ministry for Provincial Affairs and Constitutional Development, was a good source of information on the functions of local government systems during development projects of any kind within rural settlements under their control. The *White Paper on Local Government* (Department of Constitutional Development 1998) specifies each local government body's role and function as well as the manner in which these bodies should interact with one another during development projects in rural settlements under their control.

Older literature on the Swazi culture contains descriptions of traditional customs that are no longer practised due to changed living conditions in modern times. The books by Kuper (1963), *The Swazi: A South African Kingdom*, and by Marwick (1966), *The Swazi: An Ethnographic Account of the Natives of the Swaziland Protectorate*, on the cultural practices of the Swazi, contain very little reference to water utilisation practices. Consequently, alternative sources were sought. The Water Research Commission reports by Van Schalkwyk (1996) and Sami and Murray (1998) are detailed accounts of the particular water utilisation practices of residents in rural settlements. The reports provided valuable information with which the practices of the residents of the research settlements could be compared.

Unfortunately, the detail cited in the report by Van Schalkwyk (1996) does not discern between the cultures of the rural people referred to but instead uses the concept "standard of living conditions". The latter term includes the standard of housing and level of

income. Consequently, the researcher compared the research settlements' residents' water utilisation practices with those of rural people referred to in the report with a similar "standard of living conditions" within the context in which this term is understood and explained in the report by Van Schalkwyk (1996).

The literature available on the concept "quality of life" suggests that the concept has been much more extensively studied within the field of Sociology than within the field of Anthropology. The article by Smedley (1979a) "The assessment of quality of life" and the books by Smedley (1979b) entitled *The concept "quality of life" and its implications for housing research* and by Möller (1992) *Quality of Life in unemployment: a survey evaluation of black township dwellers*, are works within the field of Sociology used in this research, firstly, to understand the academic definition of the concept and, secondly, as a guide for the qualitative research done amongst the residents of Makoko on the subject.

Literature on the quality of life within the field of Anthropology that proved useful for this study were especially the articles by Jonas (1983), "Lewensgehalte – 'n moontlike volkekundige benadering", and Jacobs and Pauw (1995) "Lewensgehalte van 'n landelike gemeenskap". These works emphasise the importance of culture when one measures the quality of life of a given group of people, unlike the Sociological literature, which only includes culture to a lesser extent or does not include the concept at all.

With regard to the value judgement system of the Mdluli people, Coertze's (1980) book, *Filosofiese en metodologiese grondslae van die Volkekunde*, provides information on different categories of values. Kearney's (1984) book, *World View* discusses the links between the concepts "world view" and values. De Beer (1994) in "Benutting van hernubare hulpbronne: persepsies van swartes in die noordstreek van Suid-Afrika" outlines the cosmological perceptions of sub-Saharan African cultures, which enhanced understanding of the values the Mdluli people hold with regard to water as a natural resource.

The water utilisation practices of the Mdluli was compared to the findings of Els (1996) *Die benutting van hernubare natuurlike hulpbronne by die Vanhlanganu-Mnisi van die Mhaladistrik* where he describes the water utilisation practices among the Vanhlanganu-Mnisi. However, it was clear that the research themes, namely the role and function of local government institutions, water supply, water utilisation practices and, to a lesser degree, quality of life, are not themes commonly dealt with in Anthropology. Consequently, the researcher was forced to use literature from Sociology, Law and Engineering, all based on a Western point of view. Although these works could add valuable information, the evaluations made in these works could not always be used as guidelines for evaluations in this study's research results, because the authors of these works did not consider the culture and value judgement systems of the specific groups of people they focused on to be important research aspects.

Hence, the researcher was, to a great extent, dependent on the evaluations made by the residents of the research settlements and other (specialist) spokespersons from outside the research settlements about what they considered to be fact in respect of water utilisation and the study of the quality of life of these residents.

1.5.2 Qualitative research

The researcher's introduction into the research area was achieved via the Lubambiswano Forum. The Forum was established in 1993 with the purpose of facilitating communication between representatives from the Kruger National Park and the rural settlements in the northern Nsikazi district on the border of the Park. Issues discussed at Forum meetings include the problem of animals such as lions, elephants and hyenas breaking through the Park's fences and destroying the rural people's crops and killing their cattle. The Lubambiswano Forum also organises training courses for local rural farmers' associations and women's clubs.

At the first meeting of the Lubambiswano Forum the researcher attended in September 1997, the goal and purpose of the research was explained (namely to learn about a rural

settlements' current water supply status, how the residents utilise water and how their water supply affects their daily lives) and the members of the Forum were asked to nominate a rural settlement from their area which they thought would be suitable for the research. The Forum members nominated the settlement of Makoko. A member of the Forum, Mrs Dina Phiri, was initially appointed by the Forum to accompany the researcher on visits to Makoko and to serve as an interpreter.

The first task was to meet the late *Sikhulu* (chief) MZ Mdluli, who resided in Makoko and to ask his permission to undertake the research in his tribal area. Due to the late *sikhulu's* tight schedule, a meeting could not be arranged immediately. The *sikhulu's* secretary, Fankie Mashaba, subsequently undertook to inform the *sikhulu* of the researcher's presence in the settlement and of the reason for the research. He also obtained the *sikhulu's* permission for the research to continue. The first meeting that could be arranged with *Sikhulu* Mdluli took place one month after the research had already been started.

After the first few weeks of research, it became clear that Mrs Phiri's own commitments made it impossible for her to continue to be the researcher's guide and interpreter. The fact that she lived in Kabokweni, a settlement about 30 minutes' drive from Makoko, also made it difficult for her to join the researcher on a daily basis. Consequently, a new guide/interpreter had to be found.

The best option was to find a guide from Makoko, firstly, because it would solve the problem of travelling and, secondly, because a local person would know the area and the people. During the weeks with Mrs Phiri, the researcher had realised that the research was not going according to plan, as Mrs Phiri was a stranger in Makoko, which made access to spokespersons difficult.

In order to find a new guide, the help of the *sikhulu's* secretary was again sought. It was explained that it would be preferable for the new guide to be female, as the researcher is female and it is mainly women who are involved in the daily chore of fetching water. The guide would have to be able to speak Afrikaans or English and have some knowledge

of the research subject. The secretary introduced three local women, of whom only one could speak good English. Fortunately, this lady, Lindiwe Fankomo, was prepared to assist the researcher and soon became a very trusted guide, interpreter and spokesperson. Lindiwe's friendly and inquisitive nature helped to make the research both thorough and pleasant.

The research started by focusing on learning about the current status of the water supply in Makoko. The first few days were spent driving through the settlement with the guide to ascertain where the boreholes, communal taps and natural water sources were. The working of the hand pumps, diesel pumps and communal taps was checked on and water was tasted at all the different water points. Local residents were asked about the reliability of the water sources and which water source was favoured most and why. The researcher found that private connections to the existing water supply line existed. Hence, residents were questioned on their reasons for installing private connections, the costs involved and the reliability of these sources.

All this preliminary work was done with the intention of becoming acquainted with the settlement and its residents and learning about the water supply of the settlement. It was important to become familiar with the research area and its residents, as it soon became clear that the research could only really get underway once the local people were comfortable with the researcher's presence.

Observation played an important role in this first phase of the research and indeed throughout the entire research process. Observation during trips through and outside the settlement and during visits to residents' stands led to questions previously not thought of. Such information provided deeper insight into the subject studied and led to further knowledge on the topic. It was therefore important to take short notes and ask questions either immediately or, if this was not possible, at a later stage. Notes were taken meticulously during every day spent in the field. During casual interviews with spokespersons, brief notes were jotted down so as to not disturb the course of the conversation. At the end of each day, the notes were then reviewed and a detailed

account was written down of the information gained. It was important to review the events of each day in order to follow up on gaps in, or uncertainties regarding information on the following day. Evaluations and deductions made by the researcher during interviews were at all times verified with spokespersons.

The qualitative research was done according to a research schedule. The different research themes were categorised and the research process was undertaken according to these categories. Each day was planned the evening before and the questions were devised to ensure that all the relevant aspects of the specific issue were covered. Appointments with spokespersons were made in advance, specifying a time and a location. Spokespersons interviewed during the course of the research were the following:

- Male and female spokespersons were selected from the research settlements. Mainly female spokespersons were used in researching water utilisation practices and reliability of water sources. Male and female spokespersons (including spokespersons from the Project Steering Committee of Makoko) were interviewed in researching the remaining research themes (56 spokespersons fall into this category).
- Spokespersons from the Indigenous Authority structure in the area (including the late *Sikhulu Mdluli*, *tindvuna* and the *sikhulu's* senior secretary) were interviewed (five spokespersons fall into this category).
- Spokespersons from the Department of Water Affairs and Forestry were interviewed at the Department's offices in Nelspruit and Malekutu (five spokespersons fall into this category).
- Spokespersons from the Lowveld and Escarpment District Council and the Nsikazi Representative Council were interviewed (seven spokespersons fall into this category).
- Spokespersons from private engineering firms in Nelspruit who are involved in the construction of water supply infrastructure in the northern Nsikazi district were also interviewed (six spokespersons fall into this category).

During the interviews, care was taken to ensure that each interviewee clearly understood the questions. Due to the nature of the research, which necessitated repeating the same question to different spokespersons, the interpreter sometimes became bored when asking the same question to different interviewees on the same day. At first she could not understand why different spokespersons were asked the same question and she would remind the researcher of the answers already given. It had to be explained to her that the goal was to determine trends in water utilisation practices, for example, and that various different opinions on the same topic were essential.

It became apparent that she initially changed the answer of the spokesperson if she felt that his or her answer was, according to her, not good enough or “wrong”. It was therefore necessary to explain to her that it was impossible for a spokesperson to give a wrong answer and that she had to translate exactly what was said. In order to prevent these mistranslations, the researcher had to become acquainted with the *siSwati* terms used in the translation of the questions in order to ensure that the correct question was stated and that the correct answer was translated.

Each research day usually started at 9 am at the interpreter’s house, after she had completed her early morning chores and seen to her family’s needs (this included fetching water). The morning’s research usually continued until 12:30 pm, when a lunch break was taken, and resumed at 2 pm to end around 4:30 pm. The morning’s research sometimes ended at 11:30 am during the summer months, due to the extreme heat of the Lowveld, especially when the research dictated house to house interviews and a lot of time was spent in the sun. The research would then continue from 2 pm to 4:30 pm.

The research on value judgements on water as a natural resource and on the service was undertaken in a different manner from research on the other research themes. The best information on value judgements could be obtained by interpreting the value judgements that the spokespersons incidentally expressed during discussions every day on different topics. During the last few weeks of research, evaluations were made of the residents’ value judgements on the research topic and the opinions of the interpreter and other

trusted spokespersons with whom a good relationship had been built up and who genuinely understood the purpose of the research.

The qualitative research on quality of life was done in a similar manner. The spokespersons' perceptions of what quality of life is and how the current water supply of their settlement influences their quality of life became clear as the research on this topic progressed. This information was received in an informal manner during casual discussions with spokespersons that often arose after interviews when the discussions naturally flowed on to other topics.

For the purpose of testing evaluations of and deductions about spokespersons' perceptions on quality of life, in-depth interviews were undertaken with eleven carefully chosen spokespersons of Makoko. The eleven spokespersons were chosen to be as diverse as possible to prevent the research from producing one-sided results (see below). Although it was not a prerequisite, seven of the eleven interviewees spoke good English and one-on-one interviews were done. This made it easier to have an in-depth discussion on each question. For the other four interviewees, the help of the interpreter was used.

The spokespersons for the research on quality of life were selected to have different sexes, ages and occupations. Five spokespersons were male and six were female. Three spokespersons were in their twenties, three in their thirties, three in their forties and two over sixty. Three of the spokespersons worked in the tribal office, a clerk, the secretary of the *sikhulu* and a cleaning lady. Other spokespersons included a nurse from the Makoko clinic, the *indvuna* (headman) of Makoko, the principal of the Makoko primary school, a field ranger at Skukuza in the Kruger National Park who is also a resident of Makoko, a few unemployed residents, and pensioners. The spokespersons had all lived in Makoko either since birth or for more than 30 years, except one. This spokesperson was originally from Kabokweni and had moved to Makoko with her family two years previously. Her husband was originally from Makoko.

The educational levels of the eleven spokespersons interviewed on their value judgements on quality of life and its link to water supply varied from none to tertiary education. Four

of these spokespeople were unmarried and two of these four had children. The married spokespersons all had between two and nine children. The average monthly income of the spokespersons' households ranged from R350 to R5 500. Eight of the eleven households' monthly income was less than R1500.

1.5.3 Quantitative research

The quantitative research for the whole study was done by means of questionnaires completed by 155 residents of Makoko and Phameni with the assistance of the researcher and interpreters. The objective was to test and confirm patterns and trends in water utilisation practices as well as details on all aspects of water supply determined by means of the preceding qualitative research in the two settlements. The questionnaire also verified the residents' value judgements on water as a natural resource and the values people hold regarding the nature of the water supply as a service.

It is virtually impossible to determine value judgements from questionnaires only, unless the researcher knows the people who are to complete the questionnaire very well. Therefore, the qualitative research, which preceded the quantitative research, was necessary to gain some possible answers and to pilot some questions. Due largely to the transcultural nature of the research, it was necessary to learn about all the aspects involved in the research themes in order to know what questions to ask. This is a method used with great success by Els (1994) during his research in the Kruger National Park.

The questionnaire for this study was compiled in English and then translated into *siSwati*. At first, it was decided that a few chosen residents from Makoko with a matric and a good knowledge of English could translate the questionnaire into *siSwati*. However, after checking the meaning of the translated *siSwati* questions with residents who were not involved in the translation process, it became clear that the English questions and the *siSwati* translation did not correspond. Consequently, the help of Professor Wilkes from the Department of African Languages at the University of Pretoria was sought to obtain a correct *siSwati* translation to the English questions. In the final questionnaire, each

question was printed in English with the *siSwati* translation underneath. The questionnaire is included in Appendix 1.

The questionnaire consisted of three parts.

- The first and longest part focused on details of private connections, details about the task of fetching water and the volume of water used per day.
- The second part focused on the respondents' perception (value judgement) of the quality of their water
- The third part focused on the respondents' value judgement of the water supply source (see Appendix 1).

The questionnaire consisted of multiple choice questions and open-ended questions. Multiple choice questions were used only when all the possible answers were already established through qualitative research or when the answers could only be "yes" or "no". The rest of the questionnaire consisted of open-ended questions, for example, "How do you collect rainwater?" and "What do you use rainwater for?" (see Appendix 1).

The questionnaire was amended many times until the final version was regarded as acceptable. The first versions were tested on the interpreter and other selected spokespersons and changes were made where necessary. The questionnaire was also discussed with the researcher's study leader before the quantitative research was done. In spite of all this preparation, the data processing of the 155 questionnaires proved that the final questionnaire still had faults and important lessons about constructing a questionnaire and anticipating answer possibilities were learnt. For example, the question "Which water source do you prefer?" gave the choices of Sabi River/ borehole/ fountain/ rainwater. A number of the respondents from Phameni said that they preferred a well located in Phameni. The existence of this well was not known to the researcher when the questionnaire was formulated and the well was therefore not included in the answer

options. Since the “well” option was not originally included, it had to be incorporated afterwards into the data processing process.

The qualitative research was undertaken with the help of ten research assistants (second and third year anthropology students from the University of Pretoria). The questionnaire was discussed with the research assistants before they went into the field and their queries were answered. Each assistant was given a guide/interpreter from Makoko or Phameni, selected beforehand.

These guides/interpreters were selected on the basis of their ability to

- speak English
- understand the objectives of the research, and
- grasp and convey the contents of the questionnaire.

These three criteria for selection were very important, since the quality of the quantitative research was directly dependent on full understanding of the task at hand and good communication between each guide/interpreter and each research assistant in order for them to work together successfully. All the guides were trained for two weeks before the start of the questionnaire-based research in order for them to understand the objective of each question fully. As they were also serving as interpreters, their ability to translate the interviewees’ answers accurately had to be determined. In order to prevent too much time being wasted, the training was done while the researcher had real interviews with spokespersons.

A number of high school girls from Makoko had voluntarily participated in the afternoons as co-interpreters during the preceding qualitative research and now expected to be selected as guides/interpreters for the quantitative research. However, it was considered best to select the guides/interpreters from among residents who were unemployed non-students, as the 155 questionnaires would take three to four full week days to complete. It was not practical to expect school students to miss school in order to

help with the research. However, two of the volunteer high school girls were so eager to serve as guides/interpreters during the quantitative research that they convinced their school principal that it would be an educational experience for them and he gave them permission to miss the few days of school. The rest of the group of guides was comprised of one male and six females (eight females including the two high school girls). The guides' ages ranged from 20 to 35.

The completion of the 155 questionnaires took three full days. A total of 54.5% of the 155 questionnaires were completed in Makoko and 45.5% were completed in Phameni. On the first day, the assistants met the guides/interpreters at a pre-arranged place and time in Makoko. The researcher teamed up each assistant with a guide/interpreter, based on a personal judgement on who could work together successfully.

It so happened that when the quantitative research started, there were nine guides/interpreters and ten research assistants. Consequently, one of the guides/interpreters teamed up with two research assistants. Each research assistant interviewed an average of five respondents per day, which meant that 45 questionnaires were completed per day. The average time it took the respondents to complete one questionnaire was approximately 45 minutes.

The questionnaires were completed at the respondents' homes. During the training, the guides/interpreters were asked always to explain to the respondents who the assistants were, where they come from and what would be done with the information given in the questionnaire. The assistants and their guides/interpreters were dropped off at a certain section of Makoko or Phameni and were allocated two or three streets where they entered every second or third home and asked the residents if they would complete the questionnaire. The assistants and their guides/interpreters then met up again at a pre-determined time and location where everyone had lunch together. The afternoon's research was then continued in the same manner.

All answer options of the choice-questions were numbered to facilitate data processing. The research assistant marked the answer option of the respondent in a block next to the

option's number (see Appendix 1). The data was processed in Excel '95 and then expressed in percentages. Due to the help of the interpreters, all the questionnaires could be completed on the questionnaires in English and this eliminated the task of translating the answers, which saved time.

The open-ended questions' answers took much longer to process than those of the multiple choice questions, because every answer had to be read, evaluated and noted individually. In order to express the open-ended questions' answers in percentages, tables were drawn up with a column for every answer. The fact that there were usually only three to four different answers to a question made this process of establishing possible answers to open-ended questions reasonably simple. Open-ended questions were often designed to allow the respondents to elaborate on the answer of a preceding multiple choice question. So, for example, if the multiple choice question was "What time of the day is the queue at the water point the longest?" and the answer options were "Early morning/ Late morning/ Midday/ Late afternoon/ Early evening", then the next question would be: "Why do you say so?".

The processing of the quantitative data proved that the trends, practices and value judgements noted during qualitative research were correctly evaluated. The quantitative research did not only confirm the qualitative research, but indeed led to deeper insight into all the research themes. Most importantly, the quantitative research made it possible to express the research findings statistically, which brings a new dimension to "traditional" anthropological research (Els 1996: 56-65).

1.6 NOTE ON THE TEXT

The orthography of the *siSwati* terms used in this study is in line with that of the *Concise siSwati Dictionary* (Rycroft 1995). Throughout *siSwati*, terms such as *sikhulu*, *indvuna* (s), *tindvuna* (pl), *libandla*, *khonta* and *indlovukati* are used rather than their English translation because the cultural essence of these terms is lost in translation.

The term “settlement” is used throughout the study in references to Makoko and Phameni where the research was done. This term is used instead of “community” or “village”, which is often used in literature to describe rural places of living. The *Pocket Oxford Dictionary* (Fowler and Fowler 1969) defines the term “settlement” as “a body of social reformers living in poor district” whereas “community” is defined as “all members of a State, town, school, convent, profession, or bee-hive”. The term “community” has too wide a context and therefore the term “settlement” is preferred.

The term “private connection” is widely used in this study and refers to an illegal water connection made from a bulk water supply line to a private stand (see Section 3.2.2). The term “private connection” was preferred to the term “illegal connection” during qualitative research involving spokespersons from Makoko and Phameni, due to the strong negative connotation of the word “illegal”. “Private connection” is thus used as a euphemism for “illegal connection”. However, the term “private connection” must be understood to mean illegal connection throughout the study.

The Department of Water Affairs and Forestry is often referred to in this study by its acronym, DWAF. This is done for practical reasons (it is shorter to print, but also simpler to read). The acronym is readily used by spokespersons to refer to this government department.

The Harvard method of reference is used and the bibliography is presented in accordance with the instructions of the guide entitled *Verwysingstegnieke* (Universiteit van Pretoria) by Marlene Burger (1992).

CHAPTER TWO

AUTHORITY STRUCTURES AND WATER SUPPLY IN THE NSIKAZI DISTRICT

2.1 INTRODUCTION

This chapter provides a brief outline of the history of the ruling lineage of the Mdluli people of the Nsikazi district of Mpumalanga where the research was done, as well as a brief description of the Mdluli indigenous authority system and its function. The Mdluli history and indigenous authority system is discussed in the context of the history of the former homeland KaNgwane, which today forms part of the South African province of Mpumalanga. It is important to note the people of the former KaNgwane's relation to Swaziland, if the South African Swazi's indigenous authority system is to be understood.

The Mdluli indigenous authority structure serves as an important basis from whence the role of provincial and local government bodies in water provision can be outlined. Without this background, the implication of water provision infrastructure in the two settlements and the maintenance thereof cannot be fully understood. A description of the different roles played by provincial, local and indigenous authorities in water supply is also given to clarify the structure of a community development project and indicate the development process. Furthermore, the history and future planning of water supply infrastructure in the Nsikazi district is discussed to show a shift in the South African Government's emphasis on such developments.

2.2 CONCISE HISTORY OF THE SWAZI OF THE FORMER KANGWANE

The people of the two settlements in the Nsikazi district where the research was done, namely Makoko and Phameni, are not all Swazi. The population of the two settlements also includes Zulu, baPai and Nhlangu. The Swazi culture is, however, dominant. Spokespersons from the two settlements describe themselves as living "as Swazis" and as



adhering to elements of the Swazi culture. This is the result of strong Swazi influence on the non-Swazi people in the two settlements. In view of this fact, it seems necessary to give a short summary of the history of the South African Swazi people, how they came to live in the former homeland of KaNgwane (now part of Mpumalanga) and how they became dissociated from the kingdom of Swaziland.

2.2.1 Relationship with the Swazi of Swaziland

The Swazi of the RSA and of Swaziland share the same history up to the middle of the nineteenth century. In the mid-eighteenth century, the Swazi king, Ngwane III, and his followers were the first “Swazi” people to occupy the territory today known as Swaziland. They moved into this area from northern KwaZulu-Natal via southern Mozambique. These people became the ruling clan in Swaziland, namely the *Nkosi Dlamini*. At that time, they subjugated a number of tribes, mainly Sotho, in the area which is today known as Swaziland. Ndvungunye succeeded Ngwane III and was in turn succeeded by Sobhuza I. In 1844 Sobhuza I was succeeded by his son, Mswati I. It is from the name “Mswati” that the name of the people was eventually derived, and they became known as *emaSwati* (Mabuza 1983:2,3).

During the reign of King Mswati I, a number of Swazi princes moved out of Swaziland to settle in the areas formerly called the Eastern Transvaal and Northern Natal. After a dispute between Mswati I and two Swazi princes, namely Malambule (who acted as regent after Sobhuza I died in 1839) and Malambule’s half-brother, Prince Somcuba, the two princes and their followers fled from Swaziland. Prince Somcuba settled near the Crocodile River in the former Eastern Transvaal and was later killed by King Mswati I for performing his own *Incwala* ceremony. The *Incwala* ceremony celebrates the first fruits of the season and may only be performed by the Swazi king (Marwick 1966:270). After the death of Somcuba, his surviving sons fled to Sekhukhuniland. Prince Bhevula, who also fled from Swaziland during the reign of Mswati I, settled in the White River district after the Anglo-Boer war. Prince Nyamayenja, another descendent prince, was driven out of Swaziland by King Mswati I. Nyamayenja and his followers, later known

as the Ndlela, settled in the Piet Retief district in the area formerly called Northern Natal (Mabuza, 1983:3).

King Mswati I died in 1858. His son Ludvonga later succeeded him in 1868 (Kuper 1963:10). Mswati's elder son, Mbilini, who contested the succession of Ludvonga, fled from Swaziland with the *iNyatsi yaMswati* regiment and was later given asylum by King Cetshwayo in Zululand. Some of Mbilini's subjects did not follow him into Zululand but settled in what are today the Barberton, Nelspruit, Carolina and Ermelo districts.

Prince Mabhedla also disputed Ludvonga's succession and had to flee to Sekhukhuniland with his followers. Prince Dantji of the Mpakeni tribe settled in the Barberton area after a dispute with one of his brothers. The exodus of these Swazi princes from Swaziland during and after the reign of King Mswati I is the reason for the great number of Swazi people who today live outside Swaziland's boundaries in South Africa (Mabuza 1983:4).

The border between Swaziland and the former Zuid-Afrikaansche Republiek was settled by the Pretorius and Alleyne Commissions of 1866 and 1879 and later ratified by the Pretoria Convention of 1881 as well as by the London Convention of 1884. This meant that all Swazi chieftains in South Africa fell under the authority of the Union of South Africa after 1910 and under the Republic of South Africa after 1961. With the establishment of the Swazi Territorial Authority in April 1976 and the later KaNgwane Legislative Assembly in October 1977, the Swazi of South Africa became a self-governing people within the context of the former homelands with their own central authority within KaNgwane (Mabuza 1983:4; Republic of South Africa 1951).



Table 2.1. Exodus of Swazi princes from Swaziland during and after the reign of King Mswati I (1844-1858)

King Mswati I	Became the Swazi king in 1844 in the area today known as Swaziland.
Prince Somcuba	Fled from the area today known as Swaziland during the reign of King Mswati I and settled in the former Eastern Transvaal near the Crocodile River.
Prince Bhevula	Fled from the area today known as Swaziland during the reign of King Mswati I and settled in the White River district.
Prince Nyamayenja	Driven out of the area today known as Swaziland by King Mswati I and settled in the Piet Retief district.
Prince Ludvonga	Succeeded King Mswati I in 1868.
Prince Mbilini	Fled from the area today known as Swaziland and was given asylum in Zululand
Prince Mabhedla	Fled from the area today known as Swaziland and settled in Sekhukhuniland
Prince Dantji	Left the area today known as Swaziland after a dispute with one of his brothers and settled in the Barberton district

During the reign of King Mswati I

After the death of King Mswati I

2.2.2 Political development of KaNgwane

The Swazi Territorial Authority was established on 28 November 1975 in terms of Section 2(1)(c) of the Black Authorities Act of 1951 (Republic of South Africa 1951). The Swazi Territorial Authority was given authority over three existing regional authorities, namely the Nkomazi Regional Authority, the Nsikazi-Legogote Regional Authority and the Mlondozi Regional Authority.

These three Regional Authorities were established in terms of Paragraph (b) of Sub-section (1) of Sub-section 2 of the Black Authorities Act of 1951 (Republic of South Africa 1951).

- The Nkomazi Regional Authority in the Barberton district was established on 31 December 1959.
- The Nsikazi-Legogote Regional Authority in the Nelspruit district was established on 2 November 1962.
- The Mlondozi Regional Authority in the Carolina district was established on 3 October 1975.

In terms of Government Notice No 1291 of 17 August 1962, six Tribal Authorities fell under the Nsikazi-Legogote Regional Authority. These six Tribal Authorities included

- the Mdluli Tribal Authority;
- the Gutswa Tribal Authority;
- the Nkambeni Tribal Authority;
- the Mpakeni Tribal Authority;
- the Masoyi Tribal Authority; and
- the Mbuyane Tribal Authority.

The two settlements where the research for this study was done, namely Makoko and Phameni, are respectively located within the areas of the Mdluli and Gutswa Tribal Authorities.

In 1976 the Swazi Territorial Authority had twenty-eight members of Parliament with *Sikhulu* J.M. Dlamini as Chief Executive Officer. Internal political strife in KaNgwane lead to the dismissal of *Sikhulu* Dlamini as Chief Executive Officer and to the election of Mr E.J. Mabuza to the position in March 1978 (Mabuza 1983:6). In line with the Constitution of the Republic of South Africa, No 200 of 1993 Annexure 1 (Republic of South Africa 1993), the KaNgwane Legislative Assembly, established in accordance with Article 1 of the Constitution of Self-Governing Territories (Republic of South Africa 1971), became part of the South African province of the Eastern Transvaal after the 1994 elections. The name of the Eastern Transvaal was changed to Mpumalanga in 1995.

2.2.3 Constitutional development: the role and function of tribal chiefs

The first official acknowledgment of the position of tribal chiefs in the Union of South Africa came with the acceptance of the Native Administration Act (Act 38 of 1927) (Breytenbach 1975:4). Proclamation 110 of 1957 describes the powers, duties and responsibilities of chiefs of Tribal Authorities and of headmen of Community Authorities. Els (1996:106-108) discusses this Proclamation in detail. Hartman *et al.* (1993) describe the development of the role and function of tribal authorities in detail.

The “interim” Constitution of the Republic of South Africa (Republic of South Africa 1993) states that all former self-governing territories and independent territories in South Africa are now united and regarded as national territory. Traditional authorities are acknowledged by the Constitution and, according to Article 182 of the Constitution, the “leader” of a traditional authority whose area falls within the boundaries of a local government, is an *ex officio* member of such a local authority and can be elected to any position within such a local authority (Els 1996:114-117).

2.3 HISTORY OF THE RULING LINEAGE OF THE MDLULI TRIBAL AREA

The two research settlements of Makoko and Phameni, even though they are situated within five kilometres of each other, do not fall under the auspices of the same indigenous authority. Whereas Makoko falls under the reign of *Sikhulu* Mdluli of the Mdluli Tribal Authority, Phameni is under the reign of *Sikhulu* Khumalo of the Gutswa Tribal Authority. Thus, the inhabitants of the two settlements fall under the jurisdiction of two different *tikhulu*.

For the purposes of this study, the history of the ruling lineage of the Mdluli people is discussed below. The latter was chosen purely for practical reasons, since *Sikhulu* Mdluli resides within Makoko, one of the settlements where the research was conducted, while *Sikhulu* Khumalo resides at Gutswa Kop, a settlement one hour's drive from the research area.

According to Van Warmelo (1935:111), the Mdluli are baPai, thus originally from Sotho stock. Van Warmelo (1935:111) believes this is proven by their language, described as a "peculiar form of Sotho". The name "baPai" is derived from Mbayi Hill, "which is thought to be situated far to the South near or in Swaziland". The baPai lived in the area of Mbayi Hill long ago until they were forced northwards during the influx of the Swazi forebears into Swaziland (Van Warmelo 1935:111).

The baPai are said to have associated with the Kutswe, an eastern Sotho tribe who subjugated the baPai near the Swaziland border. The two tribes migrated north together. The baPai eventually dissociated themselves from the Kutswe and settled in the areas around what are today Pilgrimsrest, Schoonoord, Nelspruit and Barberton. According to Van Warmelo (1935:111), nothing is known of the relations and links between small groups of baPai in these areas. Van Warmelo's (1935) Map 14 shows that the baPai, during the reign of *Sikhulu* Jacob Mdluli, settled close to the border of the Kruger National Park, where they still live today (Van Warmelo 1935:Map 14).

The Mdluli tribe is made up of remnants of baPai, Nhlangu and Swazi-speaking people. Pai as a language is “almost dead” and the language most used is *siSwati* and a form of “corrupt Zulu” (Van Warmelo 1942: f 30). The Nhlangu living among the Mdluli are reported to have abandoned their own language, Tsonga. The people from the Mdluli tribe predominantly practise the Swazi culture. This is confirmed by spokespersons who say that they refer to the *sikhulu*’s first wife as *indlovukati*, meaning she-elephant, a traditional Swazi term for the queen mother (Van Warmelo 1942: f 30). Mdluli spokespersons said that they live according to Swazi culture even though the population consists of a mixture of Nhlangu, baPai, Zulu and Swazi. This explains why Van Warmelo’s unpublished report on the chiefs and tribes of the Nelspruit district (Van Warmelo 1942: f 45) refers to the people of the Mdluli tribe as “Mbayi turned Swazi”.

According to Van Warmelo (1942: f 30), very little is known about the origin of the Mdluli. Van Warmelo received his information on the Mdluli history in interviews at Mtimba in 1942 with Zanunu Mdluli, the son of the deceased *sikhulu* of the Mdluli, Jacob Mdluli, as well as from a number of Mdluli elders.

In drawing up the genealogy of the Mdluli rulers, Van Warmelo (1942: f 45) states that a man called Silimanyama Mdluli was born in Zululand, but the exact location and dates are unknown. Silimanyama settled “on the Mokwena where it flows into the Nkomati” and later moved to Mhukwini, “a hill north of Pretorius Kop”. Here Van Warmelo was referring to the area of Pretorius Kop, which today forms part of the Kruger National Park in Mpumalanga. Silimanyama was killed at Pretorius Kop during a Swazi raid and his people fled and scattered (Van Warmelo 1942: f 45).

Silimanyama’s son and successor, Bashise, moved to the Soutpansberg where he and his followers lived under the protection of João Albasini. During the time of the “battle of kaMahuluhulu”, a Swazi attack on the Sotho at Mariepskop in 1864, Bashise and his people moved to Sekhukhuniland to settle under Sekhukhune (Van Warmelo 1943: f 30). When Sekhukhune “became involved in a war with the Europeans”, Bashise and his

followers settled along the Sabi River, on what Van Warmelo (1943: f 30) refers to as “Perrys Farm 171”, where Bashise died “some considerable time prior to the rinderpest, 1897” (Van Warmelo 1943: f 30).

Bashise’s successor was his son, Jacob Mdluli. Under Jacob Mdluli’s leadership, Van Warmelo (1942: f30) claims, the Mdluli settled in kaNyandza (on what Van Warmelo [1942: f30] refers to as “Harmony or Langespruit 291”) until about 1926, when they moved to the area where they live at present (Map 3). Van Warmelo (1942: f30) describes this area as the “eNumbi ridge almost on the border of the Game Reserve”. Jacob Mdluli died there in 1941. Jacob had eight wives, of whom Nshalati, daughter of Mbalezulu Duba, a Swazi, was the *indlovukati*. Jacob’s other seven wives are not recorded either by Van der Merwe or by Van Warmelo (1992: f 2; 1942: f 30).

According to Van der Merwe’s unpublished report of 1992 on the history of the Mdluli tribe (1992: f 2), Mdluli spokespersons support Van Warmelo’s (1942: f 30) facts “as far as they can remember and their knowledge go[es]”.

Jacob’s oldest son and his would-be successor, Shubane Charlie Mdluli, the son of Jacob’s principal wife, Nshalati, died while his father, Jacob, still reigned. Shubane’s younger brother, Sithupa Silandzise (also a son by Nshalati), was next in line to become *sikhulu* of the Mdluli. Because Sithupa was still young, Jacob’s brother Mandundu Zanuni Mdluli became the *Lilambela* (acting *sikhulu*) for the minor Sithupa. Sithupa also died before coming of age. With the death of the *Lilambela* Mandundu in 1963, Jacob’s oldest living son and the next in line, Mqoshwa Zephonia Mdluli, inherited the throne (Van der Merwe 1992:f 3).

Mqoshwa Zephonia Mdluli was appointed *sikhulu* in 1964 in accordance with Subarticle (7) of Article 2 of the Black Administration Act (Republic of South Africa 1927) as defined in the Amendment of Government Notice No 1291 of 17th August 1962.

Mqoshwa Zephonia Mdluli died on 27 October 1998 during the time when this research was being conducted. His eldest son, Izak Mdluli, who was 34 years old at the time, was

appointed as successor. According to Mdluli spokespersons, Izak Mdluli was officially inaugurated as *sikhulu* one year after the late *sikhulu*'s death when his wives' mourning period was over, thus October 1999.

2.3.1 The Mdluli Tribal Area

Proclamation 1291 in the Government Gazette of 17 August 1962 (Republic of South Africa 1962) indicates the boundaries of the Tribal Authorities within the Nsikazi district (at that time referred to as the "Nsikazi reserve" in the Nelspruit district). The Proclamation also defines the establishment of six Tribal Authorities, including the Mdluli tribe, in the Nsikazi "reserve" in the Nelspruit district.

The boundaries of the Mdluli tribal area are defined as follows:

From the cement beacon situated on the boundary of the Kruger National Park and approximately 15 yards to the south of the Provincial bituminized road at Numbi Gate; thence in an easterly and southerly direction along the boundary of the Kruger National Park to the point where it joins the Nsikazi River to its confluence with the Nsikazi Spruit; thence upstream along the Nsikazi Spruit to the middle of the wall of the Nsikazana Dam; thence in a straight line in a north-easterly direction to the summit of Mpameni Kop; thence in a straight line in an easterly direction for approximately 2, 765 yards to a cement beacon on the bank of the Nsikazi River at a point where three spruits flow into the said river at approximately the same place; thence upstream along the Nsikazi River to its confluence with an unnamed spruit on Lot no 155; thence in a straight line in a north-westerly direction across Mahushu Kop to a cement beacon situated 15 yards to the south of the Provincial bituminized road from Pretorius Kop at the point where the said road joins the bituminized road between Bosbokrand and White River; thence in a south-easterly direction approximately 15 yards south of the Provincial bituminized road from Pretorius Kop and parallel to the said road to the point of commencement.

There are four settlements which fall within the jurisdiction of the Mdluli Tribal Authority, namely Makoko, Salubindza, Bekiswayo and Nyongani. According to Mdluli spokespersons, the late *Sikhulu* M Z Mdluli had no say in defining the boundaries of the tribal area. The boundaries were demarcated by the former South African Government's Department of Native Affairs in Proclamation 1291 in the Government Gazette, 17

August 1962 (Republic of South Africa 1962). This is confirmed by a report written by Van Warmelo in 1943 (1943: f 24-27) as an addendum to his inquiry report of 1942, in which details of a census count in what was then the Nelspruit district is given. The aim of the census was to establish how the followers of each *sikhulu* were distributed across the Nsikazi reserve within the Nelspruit district and the size of the population of each *sikhulu*'s area. On the basis of this information, the Nsikazi reserve would be divided into different areas. This was to be done in such a manner as to cause the minimum of disturbance "in case people want to remain under their present chiefs", but also "with some regard for the topography of the country, and existing natural boundaries" (Van Warmelo 1943: f 24-27).

The Van Warmelo report of 1943 (File 33-35 1943: f 24-27) then goes on to state that it is "quite out of the question" to keep each chief's people in his area due to the "positively fantastic distribution of some chiefs' adherents" and that the chiefs should be "lucky to get as many as they do".

As mentioned above, there were four settlements under the rule of the late *Sikhulu* M Z. Mdluli within the Mdluli tribal area, namely Makoko, Salubindza, Bekiswayo and Nyongani. The two settlements of Salubindza and Bekiswayo are situated 15 kilometres to the northwest of Makoko. The late *Sikhulu* Mdluli lived in Makoko and the Mdluli Tribal Office is also situated there. Spokespersons say the two settlements of Salubindza and Bekiswayo used to be known only as Salubindza, named after the Salubindza stream which divides the settlement in two. As population figures in Salubindza rose, the settlement was divided into two separate parts with the stream forming the boundary. This happened in 1980/1981. The area to the southeast of the stream was still called Salubindza, whereas the area to the northwest of the stream became known as Bekiswayo, named after the Bekiswako School, which was already in the area. Both spellings, "Bekiswayo" and "Bekiswako", are used. The name refers to "bhaBekiswayo" the praise name of the Mdluli, also known as the Mdluli's *isininatelo*.



According to spokespersons, the name “Makoko” was derived from that of a person, Makoko Shabangu. Long ago, when the Swazi people still lived far from one another and not in clusters as they do today, Makoko Shabangu and his family lived in the area today known as Makoko. As time passed, boundaries between people were fixed and population figures increased. This forced people to move closer to each other. The “spot” where Makoko Shabangu lived happened to be viable for cattle farming because it was in the vicinity of the Nsikazi River where there was ample water. As people started moving closer to one another they settled in areas which suited their needs. When they were asked where they were going, the answer would be: “we are going to Makoko’s place”. Thus the area became known as Makoko.

The story of how some of the Mdluli people came to live in the settlement named Nyongani goes back to the time when Swazi people still lived in the area which today falls within the boundaries of the Kruger National Park.

According to spokespersons, people from the Mdluli tribe lived in an area named Mkhukhu. Today, this area falls just within the boundary of the Kruger National Park, to the northeast of the Makoko settlement. Mandundu, the acting *sikhulu* or *lilambela* for the late M Z Mdluli, lived at Mkhukhu in this youth.

In 1969/1970, with the building of the Kaapmuiden-Phalaborwa railway line, on the western border of the Kruger National Park, the Mdluli people living at Mkhukhu were removed by the officials of the Kruger National Park and resettled at Nyongani, a settlement located close to the Hazyview Station. The name “Nyongani” is derived from the name of a man called Nyongani Mkabela. This is a case similar to that of Makoko. Before people started living in clusters as they do today, Nyongani Mkabela lived with his family in the area that later came to be known as Nyongani (the place of Nyongani).

The Nyongani settlement is located roughly 20 kilometres from Makoko. The resettlement of some of the Mdluli people to Nyongani happened after the late M Z Mdluli had been appointed *sikhulu* and had settled at Makoko.

2.4 THE INDIGENOUS AUTHORITY SYSTEM OF THE MDLULI

2.4.1 Central authority system

Within the Mdluli tribal area in the Nsikazi district of Mpumalanga, according to spokespersons, the central authority rests with the *sikhulu*. On a socio-political level, the *sikhulu* is, according to spokespersons, the highest authority and is perceived by his subjects as the “head or representative of the tribe”.

In reality, though, central authority within the Mdluli Tribal Authority does not rest with the *sikhulu* alone, but with the *sikhulu*-in-council. Spokespersons said the *sikhulu*'s council is called a “cabinet” or *libandla la sikhulu* (a *libandla* is an assembly of elders). The *libandla* consists of the *tindvuna* (ward headmen) of the four settlements of the Mdluli tribal area and the councillors of each *indvuna*. Each *indvuna*'s councillors are members of his settlement and are chosen by the residents of the settlement.

The *libandla* meets with the *sikhulu* every Monday at the Tribal Offices in Makoko to discuss the week's events of each *indvuna*'s settlement. All matters concerning internal tribal politics are discussed and decisions on these matters are made. Spokespersons said that unlike the *tindvuna*, the councillors of each *indvuna* are not all expected to be at each weekly meeting.

Apart from the *libandla*, the *sikhulu* also has one principal advisor. This man is the *sikhulu*'s senior secretary and he has a superior advisory position to the *sikhulu*. According to spokespersons from the Mdluli tribe, the current senior secretary has a tertiary education and was a member of the former KaNgwane Parliament. He must also be someone that the *sikhulu* feels is trustworthy, tolerant and always willing to assist the *sikhulu*.

Marwick (1966:269) indicates that in the distant past the family council played an important role in the decisions made by a Swazi king or by a *sikhulu*. The Swazi king was mainly assisted by his mother, the *indlovukati* (she-elephant) whose advice he would



take in all matters. His older relatives, such as uncles and brothers, were also supposed to assist him during proceedings of the tribal elders.

According to spokespersons, the role of the “family council” among the Mdluli has largely been taken over by the *libandla*. This is due to the fact that, in recent times, the *sikhulu*’s family members no longer live within close proximity of each other, or even in the same tribal area, and therefore it is not possible for them to be present at weekly meetings. The late *sikhulu*, M.Z. Mdluli’s sister, Phelani Mdluli, is his only sibling and occasionally acted as his advisor regarding internal family matters, such as succession. Phelani Mdluli lives in Phoka, a settlement which is one hour’s drive from Makoko and not within the Mdluli tribal area. Given this distance she could not fulfill the role of the *indlovukati*. Hence the *sikhulu*’s principal wife fulfilled this role.

The *libandla* also has the important task of assisting the *sikhulu* in matters of the *sikhulu*’s court. According to the Black Administration Act (Republic of South Africa 1927) and Black Administration Act 1927, Amendment Act (Republic of South Africa 1929), the jurisdiction of a chief’s court includes “all civil claims and disputes arising out of black law and custom between black people within his area of jurisdiction”. Examples of such cases would be claims arising from *lobolo* or disputes about succession. The chief has no jurisdiction to hear cases on divorce or separation arising from a civil marriage. As far as criminal jurisdiction is concerned, the chief can only try cases of common assault and petty theft and there can be no legal representation for any party during a court case.

The *sikhulu*’s secretary at the tribal office in Makoko has a copy of the Black Administration Act of 1927 and he reported that the *sikhulu*’s court operates in accordance with the stipulations of that Act.

On Mondays when the *libandla* sits at the tribal office to give the *sikhulu* their report on matters arising in their different wards, it is also decided which cases will be tried in the *sikhulu*’s court. Wednesday is “court day”, when the *libandla* gathers at the tribal offices to operate as the court council. Apart from the *libandla* and the *sikhulu*, the tribal

secretary and the tribal office clerk are also present to note all cases and record the verdict of the court.

According to spokespersons, the court is managed by the *ndvunankhulu*. The *ndvunankhulu* or *nkosana* (small *sikhulu*) can be described as the most senior *indvuna* in the Mdluli tribal area (discussed below). The tribal office sends out a summons to the parties who have to be present during the trial. Since there is no representation in this court, the plaintiff states his/her case to the court, the accused is asked if he/she agrees with what has been said and is given a chance to state his/her case. If there is agreement between the plaintiff and accused, in other words, if the accused admits guilt, the court issues the fine or sentence and the case is closed.

If the accused does not agree with what has been said, spokespersons say that witnesses can be called and the accused is asked to tell his/her version of what happened. The court asks questions and cross-examines the accused, plaintiff and witnesses until all parties feel that the whole truth has been told. According to spokespersons, it almost always turns out that the accused admits guilt and the case is settled. In instances where no verdict is reached, according to spokespersons, the matter is referred to the Magistrate's Court. Apparently this seldom happens. As the legal system in the tribal area was not the focus of the study, the matter was not pursued further, apart from establishing what the authority structure in the tribal area is.

Matters that are most commonly tried in the *sikhulu*'s court are cases of property trespass, disputes between families in customary marriages, petty theft and common assault. The tribal court gives fines and suspended sentences. In one such case, the court gave the guilty party a fine of R250 for failing to hand over *lobolo*. All such money is sent to the Magistrate's Office in Kabokweni where it is paid into the Mdluli Tribal Authority's account. Spokespersons said these funds are used to contribute to the payment of the Tribal Office's bills, such as electricity and telephone bills and to help pay a stipend to the *sikhulu*.

All cases tried in the tribal court at Makoko must be reported to the Magistrate's Office in Kabokweni. Once a case has been settled, four copies of the court report are made. One copy is kept by the Magistrate's Office, one by the plaintiff, one by the accused and one by the tribal office.

2.4.2 Decentralized Authority System (Tribal Wards)

Each individual settlement (tribal ward) in the Mdluli tribal area is under the decentralized authority of an *indvuna*. The residents of a settlement elect their own *indvuna*. The *sikhulu* has no say in the election of *tindvuna* and they are not necessarily related to him. Spokespersons report that after an *indvuna* has been elected, he is taken to the *sikhulu* to be introduced as the settlement's new *indvuna*. The *sikhulu* cannot reject him because the *indvuna* is elected by the *indvuna*'s own people. If, in due course, the *sikhulu* perceives the *indvuna* to be incompetent, he can inform the residents of the relevant settlement and ask them to elect a new *indvuna*.

An *indvuna* has to be a fair man, respected by the residents of the settlement for his compassion and interest in their well-being and for his ability and willingness to solve problems. The residents of the settlement trust their *indvuna*, as their representative to the *sikhulu*, to inform the *sikhulu* about the residents' problems and complaints regarding everyday life. The *indvuna* is seen as the link between a settlement's people and the *sikhulu*.

Unlike in the case of the *sikhulu*, an *indvuna*'s son does not automatically succeed his father. Whenever an *indvuna* dies or resigns his position, the residents of the settlement elect a new *indvuna*.

Apart from maintaining order and discipline in his settlement, the *indvuna* also has the task of allocating stands to residents and managing the *indvuna*'s court. The *indvuna* of Makoko is also a member of the local RDC (Reconstruction and Development Committee) and therefore plays a direct role in the development of his settlement.

The *indvuna*'s court tries lesser cases arising within the settlement. Unsettled matters are taken to the *sikhulu*'s court. The *indvuna* also elects to his own court council people whom he trusts. The *indvuna* of Makoko has four councillors, three men and one woman, all trusted elders in the settlement. One of these men is the *lesikela le indvuna* or deputy ward headman of Makoko. The councillors are not necessarily the *indvuna*'s family members.

If an accused is not satisfied with the decision of the *indvuna*'s court, the plaintiff can take the matter to the *sikhulu*'s court to be retried. If he/she is still not satisfied with the *sikhulu*'s court's decision, the plaintiff can then appeal to the Magistrate's Court. This is why the Magistrate's Office must have copies of all cases tried by the tribal court.

Fines imposed by the *indvuna*'s court are reported to be between R30 and R50. Fines given in the *sikhulu*'s court are much higher. This difference is mostly because the offences are of a more serious nature, but also because the *sikhulu* fines the accused for "playing with his *indvuna*". In other words, the accused disregards his *indvuna*'s authority within the settlement. All fines paid to the *indvuna*'s court are given to the tribal secretary and paid into the Mdluli Tribal Authority's account.

The *ndvunankhulu* (senior *indvuna*) of the Mdluli tribe is also the *indvuna* of Makoko. According to spokespersons, the *ndvunankhulu* is elected to this position during a meeting of all the *tindvuna* of the tribal area and the *sikhulu*. The *tindvuna* select one man from among them and the *sikhulu* questions this candidate regarding the performance of the duties of a *ndvunankhulu*. If the *sikhulu* is satisfied with the candidate's answers, the man is inaugurated as the *ndvunankhulu*.

Spokespersons indicate that the duties of a *ndvunankhulu* include chairing all meetings held by the *libandla* as well as judging court cases on Wednesdays when the *sikhulu* is not present. The *ndvunankhulu* is also known as *nkosana* or small *sikhulu*, implying that, when the *sikhulu* is absent, the *ndvunankhulu* embodies the highest authority and acts as *sikhulu*. The *ndvunankhulu* must report to the *sikhulu* when the *sikhulu* returns on all that happened during his absence.

Residents of a settlement also elect a deputy headman or *lisekela le indvuna*. Spokespersons say that this man's rank is just below that of the *indvuna* and that he is regarded as having a "sympathetic shoulder" and a willingness to help in times of trouble. The *lisekela le indvuna* normally functions within the section of the settlement located furthest from the residence of the *indvuna*, but he is still under the authority of the *indvuna*. This arrangement is made purely for practical reasons due to the size and layout of the settlements.

2.5 THE LAND TENURE SYSTEM IN MAKOKO AND PHAMENI

Before 1980, stand sizes in Makoko were 150m × 150m. Since then, due to population growth, stand sizes were changed to 30m × 25m. According to spokespersons, the decision on stand sizes rested with the Department of Agriculture of the former KaNgwane. Settlements are now divided into streets with stands on both sides to form a rectangular grid.

All stands have numbers and each stand owner's name is recorded next to his/her stand number in a book used specifically for this purpose. This "stand book" is kept at the tribal office. The payment of *khonta* fees (see below) is also noted in this book.

The area of each settlement considered to be the most fertile is kept aside for horticulture. The remaining area within the settlement serves as the grazing area for livestock.

The procedure a new resident must follow when he/she wants to apply for a stand in Makoko is to firstly introduce him/herself to the *indvuna* and to inform the *indvuna* of his/her desire to acquire a stand. The *indvuna* then takes the person to the *sikhulu* and introduces him/her as a new resident. If the resident has moved from a settlement in another tribal area to resettle in the Mdluli tribal area, a transfer letter from his/her previous *sikhulu* or the mayor of the township must be provided. Spokespersons say this letter gives a report on the person's character and the reasons for his/her leaving the settlement or township where he/she previously lived.



The resident must then pay a single payment of R100 as *khonta* fees, whereafter an annual payment of R6 serves as *khonta* fees. The word *khonta* literally means “to pay allegiance to” and *khonta* fees are symbolic of the resident’s loyalty towards his/her *sikhulu*. The annual R6 paid by all residents of a settlement is actually made up of two payments in one. Thus, R3 is paid as *khonta* fees and R3 is paid as *masimini*. *Masimini* is money paid for the right to practise horticulture and to graze stock in the tribal ward. The word *masimini* is derived from the word *insimi*, which means cultivated land or field. The territory of the settlement is seen to be held in trust by the *sikhulu* of the tribal area and therefore residents must pay for the right to use “the *sikhulu*’s” land. According to spokespersons, *khonta* fees are deposited in the Mdluli Tribal Authority account at the Magistrate’s Office in Kabokweni.

Because population figures are rising rapidly, spokespersons from the Mdluli Tribal Office said no resident of the Mdluli tribal area can have more than one stand, except if the second stand is used for a business. If a man has more than one wife, the whole extended family has to live on the same stand. *Tindvuna* report that exceptions are made in certain cases to prevent quarrels between wives of one husband who do not want to share the same stand.

According to spokespersons, polygyny is not generally practised in the area. Marwick (1966:38) suggests that polygyny was a Swazi preference that adds status to a man in the eyes of his peers. However, according to Marwick (1966:38), polygyny has been decreasing since the early twentieth century, due to factors such as the influence of missionaries, the weakening of family and tribal sanctions, and economic pressure. Allen (1974:154) stresses that Swazi women do not like polygyny, mainly because it causes friction within the household. Nevertheless, spokespersons indicated that a woman does not normally prevent her husband from having other wives beside herself.

During interviews, *tindvuna* stated that a single man is not permitted to live on his own stand before he is married, because such a situation would cause trouble in the form of “parties”. A young man must live on his father’s stand and under his father’s authority



until he marries. The same rule applies to unmarried women. A woman only lives without a husband (or father or brother) if she is divorced with children or widowed. If the divorce is caused by the husband's behaviour, the woman and her children can stay on the stand and the man must get another stand. The idea is that the original stand owned by the husband will one day belong to his children and that they can contact him whenever they need anything. If the divorce is caused by intolerable behaviour by the wife, spokespersons say that she must move back to her father's stand, while the children stay with their father and his people.

Spokespersons say that traditional rules are no longer followed with regard to where adult children live after marriage. They can choose where they want to live. It has been noticed in the research area that young married couples often share a stand with their parents. In most such cases, married women whose husbands are absent live on their parents' stand. In some instances, the father of the house is absent or deceased and the married son and his spouse live with the husband's mother. Allen's (1974:331) study shows that it is common practice for a newly married woman to live with her husband on his parents' stand but that often the married couple eventually move to their own separate stand. Spokespersons confirm that this is also the case in Makoko and Phameni.

The residents of Makoko include a number of refugees from Mozambique. Spokespersons said these refugees are treated as normal residents and there is no hostility towards them. *Tindvuna* reported that refugees who want to reside in their settlement must be individuals whom they have come to know over a period of time. Usually the refugees work on a farm at Kiepersol (Hazeyview) (see Map 2) and come to visit the *indvuna* regularly and eventually ask him for a stand. If the *indvuna* approves of the person, he/she would be given a stand and he/she is expected to pay *khonta* fees like all the other residents. *Tindvuna* further reported that there has been a decrease of refugees coming in over the last few years due to frequent police raids to remove illegal immigrants from the area.

2.6 POPULATION DENSITY IN MAKOKO AND PHAMENI

In 1996, the population of the entire Nsikazi district was projected by the Central Statistics Buro at 310 160. According to official figures of 1991, 81.4% of the population live in non-urban areas (commonly referred to as settlements). The black population makes up 99.7% of the entire district. The gender distribution is 47.4% male and 52.2% female. The non-urban black population was estimated at 81,2% of the entire Nsikazi district's population. Of the non-urban black population, 47.2% is male and 52.7% is female (Sentrale Statistieke 1991:96).

The largest part of the population of the Nsikazi district as a whole consists of children between the ages of five and nine years of age. This age group makes up 15.08% of the population of 310 160. The non-urban population of the Nsikazi district, which numbers 133 210, shows a similar trend with 29.3% of children aged between five and nine. An estimated 46.93% of the non-urban population is under the age of 15, while 58.24% of the non-urban population is under the age of 19 (Sentrale Statistieke 1991:154). These statistics in respect of age groups reflect a fast growing population, a phenomenon common in developing areas.

The two communities of Makoko and Phameni live in the northern part of the Nsikazi district and are both non-urban. Makoko has an estimated population of 5 600 and Phameni an estimated 2 200 (Makoko Needs Assessment 1996:3; Phameni Needs Assessment 1996:2). Statistics on the Nsikazi district's population indicate a rapidly growing population and this contributes to the growing water demand in the two settlements (see Sections 3.2, 3.3).



Table 2.2 Population figures of the Nsikazi district

	Total population	Black population	Non-urban, black population	Non-urban, black male population,	Non-urban, black, female population
Nsikazi district	310 160	309 466	252 026	119 089	132 937

Source: Information derived from Sentrale Statistieke 1991: 96; 154).

2.7 INCOME DISTRIBUTION IN MAKOKO AND PHAMENI

A total of 78.6% of the entire Nsikazi district's population is reported to have no income at all. This actually indicates that this percentage of the population does not have steady employment, not necessarily that there is no income. The remaining 6.2% of the entire Nsikazi population and 6.3% of the non-urban population's income varies between R1 000 and R2 999 per annum (Sentrale Statistieke 1991:154). This situation is due to the fact that the Nsikazi district offers few or no job opportunities (81.4 % of the Nsikazi district's population live in non-urban areas).

These statistics reflect the fact that it is extremely difficult to determine the income of rural households in settlements like Makoko and Phameni. The statistics mentioned above cannot be taken to be a true reflection of people's income. What the statistics do reflect, however, is the fact that the absolute majority of the residents of the rural areas of the Nsikazi district have no steady annual income and indeed a low income rate (Sentrale Statistieke 1991:154).

Therefore, an increased water demand (see Section 3.2, 3.3) among residents of the Nsikazi district cannot be ascribed to improved living conditions but rather to an increase in population figures. Given this context, it is clearly necessary to investigate the reality of water provision in the Nsikazi district.

2.8 WATER SUPPLY IN THE NSIKAZI DISTRICT

2.8.1 History of water supply in South Africa

According to the *White Paper on Water Supply and Sanitation* (Department of Water Affairs and Forestry 1994:4), water utilisation facilities in South Africa by the late nineteenth century were largely confined to commercial agriculture. Few dams had been constructed and water for irrigation was obtained directly from rivers. To try to counter the economic depression starting in 1929, and alleviate the drought which followed, the State constructed labour-intensive water schemes and, in the 1930's, subsidies were introduced to accelerate the development of private irrigation schemes (Department of Water Affairs and Forestry 1994:4).

As the industrial sector expanded in later years, the emphasis on irrigation in existing legislation proved inadequate. Consequently, a new Water Act (Republic of South Africa 1956) was promulgated in order to try to ensure equitable distribution of water for industrial and other users, and to authorise control over the abstraction, use, supply and distribution of water and prevention of water pollution (Department of Water Affairs and Forestry 1994:4).

After the Second World War, small municipal water schemes which would otherwise not have been able to provide water services of a satisfactory standard, were subsidised by the State to improve the standard of water supply. Several government regional water supply schemes were later constructed to promote the exploitation of gold. More recently, large inter-basin transfer schemes such as the Orange-Fish, Tugela-Vaal, Riviersonderend-Berg River and Usutu-Vaal projects were constructed by the State to overcome the scarcity of water and a geographical mismatch between demand and supply (Department of Water Affairs and Forestry 1994:4).

Due to South Africa's political situation prior to 1994, these developments in water supply were largely confined to the white sector of the population. Former homelands



had a lack of political legitimacy and, as a result, homeland budgets were absorbed into the payment of subsidies (Department of Water Affairs and Forestry 1994:5).

After 1994, amalgamation took place and all water and forestry personnel, functions and budgets of the previous homelands fell under a new national Department of Water Affairs and Forestry.

2.8.2 Water supply in the Nsikazi district

According to the engineer who has worked on the water supply of the Nsikazi district for the past twenty years, water reticulation pipes were installed in the Nsikazi district for the first time in 1979. Because factual literature on the water supply to the Nsikazi district is very limited, the information on the district's water infrastructure and supply was compiled on the basis of interviews with the chief water engineer for the district. The information below is based on his accumulated knowledge and experience over the past twenty years.

In 1978, a cholera epidemic broke out in the town of Kabokweni within the southern section of the Nsikazi district. This epidemic was the result of poor water supply in the area. Consequently, the former government of South Africa took action and an investigation was launched. The purpose of the investigation was to prevent a similar outbreak in future by providing the people of Kabokweni with improved water infrastructure and better quality water.

In 1979, the Former Department of Development Aid initiated a water scheme from the Crocodile River to Kabokweni (in the Guthswa traditional authority area - see Map 3). The fact that Kabokweni had been a proclaimed town since the 1960's was one reason why the former government took action in the way it did. All proclaimed towns fell under the auspices of the Department of Native Affairs while so-called rural areas fell under the auspices of the then Department of Agriculture. Because the northern Nsikazi area had no proclaimed towns, this area did not "qualify" for aid from the former Department of Native Affairs and people had to get water from rivers, streams, fountains



and some boreholes. Eventually the Kabokweni water scheme constructed in 1979 was extended to Kanyamazane (southern Nsikazi), the only other proclaimed town in the Nsikazi district.

In 1984, a master plan was drawn up to supply water to the whole of the Nsikazi district, which by that time was part of the KaNgwane homeland. At that stage the southern section of the Nsikazi district was partly provided for with water reticulation pipes, while the northern section still had no reticulation pipes. Installation of bulk water schemes in the northern half started in 1985/1986. Bulk water supply entails water reticulation pipes stretching from a river to a reservoir at a settlement and from the reservoir to taps on street corners within the settlement, but with no reticulation pipes to service individual stands.

The first settlements in the northern section of the Nsikazi district to be provided with bulk water reticulation systems were Nyongani, Shabalala, Sandrivier and Mahushu. These settlements were provided for first because they fell under the control of the former South African Development Trust and thus the former Department of Development Aid. Shortly afterwards, the rest of the settlements in the north were incorporated into the scheme by the same contractor, who constructed the water reticulation system.

Upgrading of water supply started in 1988/1989. The bulk-water reticulation system of the southern Nsikazi district was upgraded by order of the KaNgwane Government. Extra water pumps were installed in the Crocodile River to meet the increased demand. The reason for this was an increase in demand for water due to the population increase of the entire Nsikazi district. Upgrading in the northern section of the Nsikazi district started in 1994 and entailed the installation of additional water pumps in the Sabi River, but did not include extension of water reticulation pipes.

According to another engineer who is directly involved in the maintenance of the northern Nsikazi bulk water reticulation system, all bulk water schemes in the Nsikazi District were originally designed to accommodate upgrading required due to factors such

as population growth, which leads to expanding settlements, which in turn necessitates the upgrading of facilities such as water supply systems.

The former Department of Development Aid built the first reservoirs in the Nsikazi district in 1980 at Kabokweni, Pienaar and Hlau-hlau in the southern section of the district. Investigations at Kabokweni showed that more than one reservoir was needed to service the large population in the area. Even though Pienaar and Hlau-hlau were not proclaimed towns and were thus not the responsibility of the Department of Development Aid, it was decided to provide reservoirs for these two settlements as well. Eventually, five other settlements in the southern section also received reservoirs.

Nyongani, Shabalala, Sandrivier, Numbi and Mahushu were the first settlements in the northern section of the Nsikazi district to receive reservoirs in 1984/1985. Soon after that, three extra reservoirs were also constructed in the northern section.

Up until the time when this research was concluded, no dams had been built to supply the Nsikazi district with water other than earth wall dams in some of the smaller streams in the district to water stock. During the time of research the Inyaka dam was being constructed in the Merite rivulet north of the Sabi River to be completed in 2000.

According to spokespersons from the DWAF offices in Nelspruit, 13 megalitres of water is pumped from the Sabi River to the northern Nsikazi district daily. If this volume of water is divided by the population of the northern section of the Nsikazi district (that is, 177 000 people), the theoretical water provision is 76.47 litres per person per day. This is substantially more than the RDP minimum of 25 litres per person per day (see Section 2.9.6). However, in practice, the people in the settlements where the research was done do not receive this quantity, but far less. The reasons for this discrepancy are discussed in detail below.

During incidental discussions in Pretoria, a knowledgeable employee of one of the large mining companies in South Africa stated that his company had drilled about 90 boreholes in the Nsikazi district during the early 1990's. According to him, the results were very



poor. This comment is unconfirmed, but it suggests that the people living in the Nsikazi district are heavily dependent on water from the Crocodile and Sabi Rivers. Furthermore, this comment was supported by a statement by one of the directors of Mpumalanga's DWAF that boreholes are only seen as additional water sources in the Nsikazi district to supplement the primary water sources of the Sabi and Crocodile Rivers. The latter person also said that boreholes were less significant because boreholes tend to dry up in times of drought and cannot be depended on as a permanent water source.

2.8.3 Future planning by DWAF for water supply to the Nsikazi district

According to spokespersons from the DWAF offices in Nelspruit, four DWAF projects are either currently underway or planned for the district in the near future.

2.8.3.1 Northern Nsikazi Reservoirs Project

This project involves the construction of seven new reservoirs in the area of the northern Nsikazi water scheme to replace the existing plastic tanks currently serving as temporary community reservoirs. Makoko and Phameni are among the settlements that will receive permanent cement reservoirs and water meters in the near future. The business plan for this project was approved in April 1998, but due to insufficient funds the project was delayed.

2.8.3.2 Northern Nsikazi Bulk Upgrade Project

This project involves the investigation of sections of the bulk water supply pipes for leaks and unauthorised (private) connections and the subsequent repair of those pipes where necessary.

The bulk water supply line between Makoko and Phameni, as well as the branch from the bulk water line to the Makoko reservoir, must be investigated for private connections. Due to insufficient funds for the 1998 financial year, the project only started in 1999.



2.8.3.3 *Community Reticulation Project in Northern Nsikazi*

The two communities of Jerusalem and Numbi are currently part of the project for the upgrading of the water reticulation to RDP standard. This will affect the bulk water supply quantity to Makoko and Phameni in a positive manner. The Lowveld and Escarpment District Council will implement this project on behalf of DWAF.

2.8.3.4 *Nsikazi Bulk Water Meters Project*

This project involves the installation of insertion turbine flow meters throughout the northern and southern Nsikazi regional water schemes. The goals of the project include cost recovery, equitable water distribution and the detection of leaks or unauthorised connections. During the time of research the commissioning and installment of water meters were indefinitely delayed due to budget shortages.

Operations, maintenance and ownership of the Northern Nsikazi Bulk Water Scheme will in due time be transferred from DWAF to the Bushbuckridge Water Board which was officially constituted on 16 May 1998.

2.9 AUTHORITY STRUCTURES INVOLVED IN COMMUNITY WATER PROJECTS IN THE NSIKAZI DISTRICT

The role of central, provincial and local government in terms of water provision, as outlined by the *White Paper on the Water Supply and Sanitation* policy of 1994, is the following (Department of Water Affairs and Forestry 1994:11,12):

- Central government has two distinct functions, namely, managing the nation's water resources in the public interest, and ensuring that all citizens have access to adequate water and sanitation. (compare National Water Act Article 3 [Republic of South Africa 1998])
- Provincial government shares central government's responsibility for assuring water and sanitation provision specifically through the promotion of effective local



government. Close collaboration between central and provincial government is needed, given their joint interest in the development of the capacity of local government to provide water and sanitation services on an equitable basis.

- Local government, if it is functional and competent, is the key to sustainable water and sanitation development. Due to the fact that effective local government has not yet been established in all areas, water boards and local water committees have the task of water and sanitation provision for the immediate future. Water boards provide bulk water services and local committees undertake the task of local water and sanitation provision.

Water projects in the northern Nsikazi district start by identifying priority needs indicated by all the residents of the settlements in the district by means of their individual Reconstruction and Development Committees (RDC's), together with their Representative Council (RC)². Each priority list is sent to the District Council, which then prioritises projects in terms of the settlement's existing water infrastructure and population figures. The DWAF of Mpumalanga and the Lowveld and Escarpment District Council (LEDC) then allocate funds on a priority basis. Once a project has been approved, engineers and consultants are appointed to work in conjunction with the settlement's Project Steering Committee (PSC) and its Branch Executive Committee (BEC) to complete the project.

The *White Paper on Local Government* (Department of Constitutional Development 1998:27) refers to a representative council as a transitional representative council and to a local council as a transitional local council. However, during the time when the research was done, spokespersons from the said councils reported that the term "transitional" had

² The *White Paper on Local Government* (Department of Constitutional Development 1998:27) refers to a Transitional Representative Council as a "TRepC" to differentiate it from a Transitional Rural Council, which is abbreviated as "TRC". Due to the fact that spokespersons always referred to the Transitional Representative Council as a "TRC" and not a "TRepC", and later only as an RC, the abbreviation "RC" is used in the study.

been “dropped” and the councils are now referred to as representative and local councils. In this study, therefore, the said councils are referred to as representative councils (RC’s) and local councils (LC’s).

2.9.1 DWAF (National and Provincial Government)

DWAF is the custodian of water as a precious resource and has the national responsibility of ensuring that both the needs of the people and of the economy which sustains them are effectively met. DWAF’s policy is meant to ensure that all communities in the country have access to basic water services (Department of Water Affairs and Forestry 1994:1,9).

The Chief Directorate of Community Water Supply and Sanitation of South Africa has the following responsibilities (Department of Water Affairs and Forestry 1994:2):

- assuring the effective ongoing operation of potable water supply systems for which DWAF is responsible;
- planning the expansion of water services in collaboration with provincial governments;
- promoting investments necessary to achieve the expansion of services;
- developing organisations needed at local and regional level to achieve goals; and
- monitoring and regulating water supply and sanitation activities.

DWAF believes that provision of water services in poor rural communities will fail if the people themselves are not directly involved. The concept of “involvement of the people” is meant to emphasise that it is not the government’s responsibility to provide services of every kind. The people should have “a sense of entitlement towards government services” and people should therefore be willing to pay for services received (Department of Water Affairs and Forestry 1994:7).

DWAF promotes institutions at local and regional levels because they form the first contact between communities and the State and should ensure the involvement and empowerment of the population. The “empowerment of poor and marginalised communities”, as envisaged by local government institutions, entails granting service



subsidies to “the poor”, thereby providing the opportunity for low-income households to “improve their circumstances”. Furthermore, support to community organisations in the form of finances, technical skills and training will enhance “the ability of the poor to make their needs known and to take control of their own development process”. Lastly, “linkage policies” aim to link profitable growth and investment directly with redistribution and community development. An example of linkage policies is a development levy imposed in fast-growing areas, which is used to subsidise services for poor communities (Department of Water Affairs and Forestry 1998:41).

DWAF maintains that if this structure is successfully implemented, the central government can create an environment within which locally based organisations, such as local government institutions, can plan, construct and manage their own services (Department of Water Affairs and Forestry 1994:6).

The long-term goal of the central government in terms of water supply is that the provision of services should become the function of democratic local government institutions such as Metropolitan Councils (MC’s), District Councils (DC’s), Local Councils (LC’s), and Representative Councils (RC’s). Provincial government in the form of DWAF, for example, should support these local government institutions. Provision of bulk or regional water and wastewater disposal services becomes the task of Water Boards under the supervision of the Central Department of Water Affairs and Forestry (Department of Water Affairs and Forestry 1994:9).

The medium-term goal of central government is to support institutional development, in other words the development of the above-mentioned local government institutions and to provide financial and technical assistance for the development of water supply (Department of Water Affairs and Forestry 1994:10).

The short-term goal of central government is to ensure the smooth integration of all former homeland staff, functions and budgets, such as those of the former homeland of KaNgwane, into a new national Department of Water Affairs and Forestry with regional structures. The short-term goal is thus to transform and democratise water boards in



order to achieve the long-term goals of central government (Department of Water Affairs and Forestry 1994:10).

Consequently DWAF has set up a list of policy principles in terms of water supply and sanitation assuming a context of equality for all people of the country (Department of Water Affairs and Forestry 1994:8):

- Development of water supply and sanitation should be demand-driven and community-based.
- Basic services are a human right.
- Priority in planning and allocation of funds is given to communities currently inadequately served.
- Equitable regional allocation of development resources must take into account the population and existing level of development of water supply and sanitation.
- Water has economic value and service provision must not undermine its sustainability.
- The user pays to ensure development and management of water supply and sanitation.
- Water and sanitation development must be integrated with development in education and training, job creation and the promotion of local democracy.
- Environmental integrity must be present in all development activities

Spokespersons from the provincial DWAF offices in Nelspruit, Mpumalanga, reported that at present DWAF is the **water service provider** to any given settlement within the province. The local authority (LC or DC) for the settlement is the **water service authority**. This means that DWAF is only responsible for the day-to-day operation and maintenance of water provision meaning the technical aspect of water provision. The local authority is accountable to the settlement's residents for water provision and makes decisions on tariffs paid for water services as well as on development of water provision infrastructure.

As mentioned above, in due course the local authority will take over the responsibility from DWAF as the **water service provider** to settlements within its area of jurisdiction.



According to spokespersons from the DWAF offices in Nelspruit, this transfer of responsibility will be achieved by means of each district's District Transfer Committee, which will make a draft proposal on managing all the existing water schemes within its area. Until such time that the local authorities have the capacity to handle all aspects of their own water schemes, DWAF will continue to handle the technical aspect of water provision.

The *Water Services Act* (Republic of South Africa 1997: Article 11-21) describes the new policy regarding water service authorities.

2.9.2 Lowveld and Escarpment District Council (local government)

The following information on the role played by government institutions during development projects refers to development in general. Literature on the role and function of government institutions in infrastructure development outlines the development process in terms of any given development project, which automatically includes water infrastructure development.

According to the *White Paper on Local Government* (Department of Constitutional Development 1998) the 1996 Constitution of South Africa mandates local governments to:

- provide democratic and accountable government for local communities;
- ensure the provision of all services to communities in a sustainable manner;
- promote social and economic development;
- promote a safe and healthy environment; and
- encourage the involvement of communities and community organisations in matters of local government.

The powers and functions of district councils as municipal institutions are determined by provincial proclamations, which differ from province to province. According to the Local Government Transition Act, Act No 209 of 1993, a district council, with the approval of local, rural and representative councils, formulates and implements an



integrated development plan for its area of jurisdiction. A district council must also formulate and implement such a plan in respect of each local, rural and representative council. Furthermore, a district council must ensure the provision of financial, technical and administrative support service to and proper functioning of all local, rural and representative councils in its area of jurisdiction.

According to the *White Paper on Local Government* (Department of Constitutional Development 1998:26), a district council's main role is assisting in the development of new primary structures in rural areas in order to extend services such as water supply to poor rural communities. District councils serve areas of different sizes and settlement patterns, from densely populated settlements to vast, sparsely populated regions. District councils also have a strong redistributive function, as a large proportion of district council levy income is collected from urban areas. Problems with redistribution arise due to the fact that wealthy metropolitan areas do not fall within district council areas and levy income collected in metropolitan areas is used exclusively for the metropolitan area concerned. This creates a situation in which provision of water to rural areas becomes very expensive, due to the fact that the residents' low income rate (see Section 2.7) creates an inadequate tax base.

Spokespersons from the Lowveld and Escarpment District Council (LEDC) reported that the LEDC has two major functions. Firstly, the LEDC acts as the local authority for the Representative Council (see Section 2.9.2), and, secondly, it is the area's development agent regarding development projects, which include water development. The LEDC's role as development agent means it is responsible for collecting monthly levies from businesses in the area to create a budget from which funds are distributed to the different settlements' development committees. The budget is sent to the National Finance Office in Pretoria for approval. The District Council has the power to allocate funds then for different development projects.

According to spokespersons from the LEDC, additional funds are also received in the form of annual intergovernmental grants from the Departments of Local Government,



Housing and Land Administration. The Mpumalanga Department of Local Government receives funds from the above national government departments in the form of intergovernmental grants. All provincial Departments of Local Government have the authority to distribute these funds amongst the district councils of the province in respect of the number of representative councils each district council has within its area.

Spokespersons from the LEDC stated that the provincial Departments of Local Government also receive so-called “C-MIP” or Consolidated Municipal Infrastructural Programme funds. C-MIP is a programme of the National Department of Constitutional Affairs which distributes C-MIP funds to the provincial Departments of Local Government. District councils can apply to their province’s Department of Local Government for part of the C-MIP funds by specifying the amounts needed for specific development projects in specific areas. C-MIP funds are usually applied for when a district council has insufficient funds to launch a specific development project.

Spokespersons from the LEDC reported that the body is constituted of 34 members. Members are chosen representatives of representative councils and local councils falling under the auspices of the LEDC. (The difference between representative and local councils is explained below.) Members of the LEDC are elected proportionally to the members of the representative council and local councils – the more members a representative council and local council has, the more of its representatives have a seat on the LEDC. A Management Committee of fourteen members is chosen from the 34 representatives. The LEDC meets once a month and the Management Committee meets twice a month.

There is a close working relationship between a district council and government departments, such as DWAF, to keep each other informed of all development projects. All district councils report directly to their province’s Department of Local Government.



2.9.3 Representative councils and local councils

Spokespersons from the Whiteriver-Nsikazi Representative Council reported that, within the region of the Lowveld and Escarpment District Council, there are eight representative councils:

- Whiteriver-Nsikazi
- Pilgrims Rest II
- Lydenburg
- Nkomazi West
- Nkomazi East
- Barberton
- Kruger National Park South
- Nelspruit

There are ten local councils within the jurisdiction area of the Lowveld and Escarpment District Council:

- Greater Nelspruit
- Greater Whiteriver
- Graskop
- Sabi
- Malelane
- Komatipoort
- Steelpoort
- Burgersfort
- Marloth Park
- Barberton

According to spokespersons from the Whiteriver-Nsikazi Representative Council, a distinction is made between “farm or agricultural Representative Councils” and “village Representative Councils”. The farm or agricultural representative councils represent clusters of farms that surround towns while the village representative councils represent

settlements in the former homeland areas. Village representative councils enjoy a higher priority with the district council than farm representative councils in terms of funds allocated towards development, because the former are perceived to have more infrastructural developmental needs, such as water development projects.

According to spokespersons from the Whiteriver-Nsikazi Representative Council, a representative council is a local government body elected by the people from the area for which the representative council is constituted. A representative council has only representative powers at district level, due to its lack of resources. A representative council's lack of resources is due to the fact that no taxes are paid to the representative council by the people of its area. As a result, a representative council cannot sustain itself financially and the settlements it is responsible for remain underdeveloped in terms of infrastructure such as water and electricity. A district council always performs the municipal function and management of the representative councils in its area.

One of the main aims of a district council is to build the administrative and financial capacity of the representative council and its officials in order for the representative council to become autonomous. District councils accept that areas with representative councils have priority above areas with local councils for development and fund allocation. A district council allocates funds *pro rata* in terms of population sizes.

According to the Local Government Transition Act (Republic of South Africa 1993), a representative council has the following powers and duties:

- to elect amongst its members a person or persons to represent the Council on the district council in question;
- to secure through the elected person(s) the best services possible for the inhabitants of the area;
- to serve as the representative body of its area in respect of any benefits resulting from the Reconstruction and Development Programme and in the development of a democratic, effective and affordable system of local government; and

- in general, to represent the inhabitants of its area in respect of any matter relating to rural government.

According to spokespersons from the White River-Nsikazi Representative Council offices at Malekuthu, which represents the two settlements of Makoko and Phameni, the main function of the representative council is to convey the development aspirations of the local people from its area to the district council. The representative council also has the task of explaining the responsibility of the district council to the local people, namely constantly to ascertain whether a service can be sustained after a development project of any nature has been completed in a settlement because the settlement's residents can and will pay for the service and maintenance. This double function of the representative council is made clear in its collaboration with project steering committees (see Section 2.9.5).

Spokespersons from the Whiteriver-Nsikazi Representative Council stated that a representative council can develop into a local council as soon as the necessary financial capacity exists and is approved by the Department of Local Government. A local council has taxing powers and therefore the financial capacity to do its own budgeting and finance development projects within its area. Subsequently, a local council gets less development funding from the district council but when a financial crisis develops, it can apply for a grant from the Department of Local Government.

2.9.4 The Reconstruction and Development Council (RDC)

According to the chairperson of the RDC of Makoko, the link between the residents of a settlement, such as Makoko or Phameni, and local government starts with the RDC. The RDC is a local settlement body whose members are chosen by their fellow residents to represent them at district level. According to spokespersons from the White River-Nsikazi Representative Council, there is a close working relationship between a settlement's RDC and the representative council concerned to determine and prioritise the development needs of the settlement's residents which are reported to the district council for consideration.



A settlement's RDC compiles a document which defines the residents' general development needs. The needs assessment document for Makoko was viewed by the researcher at the offices of the RDC chairperson of Makoko. The document contains information on the settlement's location, traditional leaders and RDC members. The document states the settlement's existing infrastructure and problems that need attention. Lastly, the document lists residents' needs in order of priority, such as upgrading of health services, education facilities and water services. According to the chairperson, copies of the document are sent to the relevant representative council and district council offices to serve as a guideline according to which future development projects are planned and prioritised.

2.9.5 The Project Steering Committee (PSC)

According to spokespersons from Makoko, a PSC is a local settlement committee ensuring the residents' involvement and approval of projects in the settlement. The PSC's function is to represent their settlement's unique infrastructural development needs and to inform all residents of development projects to be launched in their settlement.

Spokespersons from Makoko's PSC stated that the members of a PSC are all residents of a particular settlement and are elected by their fellow residents. The chairperson of the PSC is the local representative council member who represents the specific settlement's residents at the district council.

The functions of a RDC and a PSC should not be confused. A PSC is formed once a project is launched to regulate the process from start to finish in the settlement in order to ensure the residents' approval and involvement in the specific project. The RDC is involved in the preliminary planning and prioritising of projects. Members of the settlement's PSC usually include most members of its RDC.

According to spokespersons from the Whiteriver-Nsikazi Representative Council, this structure of local resident involvement in the government process of development ensures transparency in the use of allocated funds. It is the policy of the Representative Council



that residents of the settlement must at all times be aware of the project funds allocated by the District Council or Government Departments as well as of appointed construction companies. It is the task of the PSC to ensure that wherever possible, the residents of the developing settlement must form part of the workforce for development projects in their settlements.

Spokespersons said that, in theory, a project can be initiated from two “angles” - the residents can decide that their community needs upgrading in terms of water facilities. By means of the RDC, this need is conveyed to the Representative Council, who in turn informs the District Council. If the settlement as well as the need is one of the District Council’s development priorities, in theory, funds are allocated and the project is launched. Close cooperation throughout the project must be maintained between the PSC and the appointed companies, including engineers, to ensure residents’ participation and their approval of the completed project.

In practice, however, the initiative for identifying development projects usually originates when a government department such as DWAF does research and analyses an area’s water development needs. Settlements that need infrastructural upgrading are identified, needs are prioritised and, in conjunction with the involved district council, water projects are planned. When sufficient funds are available, the representative council, the RDC, and later the PSC become involved to ensure that the residents are notified and are part of the final planning and completion of the water project. Although the Act implies a bottom-up approach to development, in practice it often remains a top-down process.

2.9.6 The Reconstruction and Development Project (RDP)

The RDP Commission’s functions are to ensure the existence and functioning of effective RDC’s in communities. It also has to ensure that any project adheres to RDP standards. The RDP standards in terms of basic water supply are the following (Department of Water Affairs and Forestry 1994:15,16):

- Quantity – a minimum of 25 litres of water per person per day for direct consumption, for preparation of food and for personal hygiene.
- Cartage – a maximum distance of 200 metres to a dwelling – and less in steep terrain.
- Availability – the flow rate of water from the outlet within the settlement should not be less than 10 litres per minute and water should be available on a regular daily basis.
- Assurance of supply – providing water with no more than one week’s interruption per year.
- Quality should be in accordance with accepted minimum standards in terms of health-related chemical and microbial contaminants and should be acceptable to consumers in terms of its potability (taste, odour and appearance).
- Upgrading – the desire of communities to upgrade basic water services for household connections should be taken into consideration during planning done by the relevant institutions such as the RDC, representative council and district council. If this is not done, the system could fail due to illegal connections, or could result in expensive upgrading later.

2.10 THE ROLE OF LOCAL GOVERNMENT IN SUPPLYING WATER TO MAKOKO AND PHAMENI

In an interview, an engineer who was directly involved in a project to extend the water reticulation pipes in Makoko at the beginning of 1998, indicated how the local government institutions function in practice.

According to the engineer, the water pipe extension project that he worked on is one of four individual projects that, put together, should improve Makoko’s water shortage to a large extent. The other three projects planned, none of which had as yet been started at the time when the research was concluded, are the following:

- the upgrading of the bulk water supply line of Makoko due to the existence of private connections (see Section 2.8.3.2);
- the building of a permanent reservoir for Makoko (see Section 2.8.3.1); and

- the repair of all private connections made to the water reticulation pipes within Makoko to prevent water loss.

The water pipe extension project already completed in 1998 provides the residents of Makoko with about 40 new water taps located on street corners. According to the engineer, these taps were installed to adhere to the RDP minimum standard of water points being within 200 metres from all residents as far as was realistically possible. Due to Makoko's existing water supply problems (an inadequate reservoir and the existence of private connections, see Sections 3.2.1 and 3.2.2.1), the 40 new water taps yield no or very little water. Only once the three the above-mentioned projects are completed will these taps yield sufficient water to comply with RDP standards.

The Lowveld and Escarpment District Council was the engineering firm's client during the water pipe extension project. According to the engineer, right from the start of the project, the firm worked directly with the Project Steering Committee (PSC) of Makoko. The PSC of Makoko supplied the engineers with a priority list of where the existing water pipes in Makoko should be extended. The PSC contact person was the community liaison officer. On the basis of two incidents during the completion of the projects, the engineer concluded that there was not always good communication between the PSC and the residents or the PSC and the engineering firm.

Firstly, as the policy of the PSC stipulates, the workforce on the water pipe extension project was a team of local male residents from Makoko. Shortly after the project in Makoko started, there was a disagreement between the PSC and the local workers about the workers' remuneration. The wages agreed upon between the PSC and the contractor were less than those agreed upon between the PSC and the workforce. In the end, the contractor had no choice but to alter his budget to pay the workers the amount the PSC and the workers had agreed on.

As the project continued, a second quarrel arose between the PSC and the workers. The foreman of the workers was under the impression that the water pipes would also be extended to Makoko B (Mashonisa), where the foreman lived. The residents of Makoko



B felt there was a demand for water points closer to their residences. When it became apparent that this was not the case, the foreman confronted the engineer, who in turn informed him that Makoko B was not on the list for installation and that no extension of water pipes was planned for that section of Makoko.

The engineer concluded that the PSC members did not believe that Makoko B was in need of extended water pipes and that Makoko B was therefore not included on the list of sections of Makoko that needed water pipe extension. The engineer further mentioned that none of Makoko's PSC members lived in Makoko B and that this might be a reason why the PSC members had no knowledge of the need for water points closer to residences in Makoko B. He also added that he felt the foreman of the workforce should become a member of the PSC, to ensure representation for all Makoko's residents.

As Makoko's water pipe upgrading project neared completion, it became apparent that there were sufficient funds for the project to continue and to extend the water pipes in sections of Makoko that were not on the PSC's original priority list. This meant that Makoko B's water pipes were also extended to provide water points closer to its residents' homes.

From this example, it seems clear that the constitutional mandate of local government, in this case the Lowveld and Escarpment District Council, to encourage the involvement of communities and community organisations in matters of local government, was met. The existence and functioning of the PSC of Makoko ensures the involvement of community organisations. Furthermore, the Local Government Transition Act No 209 of 1993 stipulates that the RC of a rural area has the duty to secure the best services possible for the inhabitants of the area. This duty is fulfilled through the RC's collaboration with the PSC of Makoko to determine the Makoko residents' priorities for water supply development.

It is the policy of the PSC to be representative of the settlement's unique infrastructural development needs (see Section 2.9.5) in order to ensure that development projects of any nature is to the residents' advantage and meet with their approval. It can thus be



concluded from the two above incidents during the water pipe extension project in Makoko that this function of the PSC of Makoko is not always performed to the satisfaction of all residents. However, according to the engineer involved in the water pipe extension project, it is not that the members of Makoko's PSC are not trying their best, but rather that they lack the capacity to manage such projects. The concept of a PSC was only established after the national elections of 1994 and the functioning of such councils is a new experience for all involved. The engineer therefore contended that the PSC's mistakes are due to inexperience and said that he believed that the PSC's capacity to manage development projects will improve as they gain more experience.

A further point of note is that the members of Makoko's PSC change with every new development project. After the completion of the water pipe extension project, a second project was initiated to tar the road between Makoko and Malekuthu. The engineering firm involved in the water pipe extension project was also involved in the road-tarring project. The PSC members involved in the road-tarring project were, however, different residents of Makoko from those who were involved in the water pipe project. This meant that the experience and capacity the PSC members of the water pipe project had built up in terms of conveying the detail of the project to the residents of Makoko and conveying the residents' needs and suggestions to the engineers and the RC was now lost. If for every new development project there are different PSC members representing the residents of the settlement, it means that every new project has to be completed with the contribution of inexperienced PSC members. This could imply that the lack of capacity of the PSC will take longer to overcome than it would if the members were on the committee on a permanent basis, or at least some experienced members are retained.

The engineer involved in the road-tarring project (also involved in the water pipe project) agreed with this statement. He stated that it would generate more stability within the PSC if the members were permanent. The engineer pointed out that all the PSC members of Makoko did not always attend meetings between the engineers and the PSC. As a result of this, it was decided that no quorum was required at PSC meetings and that the meetings would continue even if certain PSC members were not present. All decisions

made at meetings would be binding and PSC members who were not present at previous meetings could not query such decisions. This in itself is a self-defeating process and has no benefit for the residents of the settlement. Only the engineer can benefit from this, as his company can continue with its work.

According to the engineer, the fact that all PSC members did not attend all meetings might be related to misconceptions about the responsibility involved in being a PSC member. He suggested that the District Councils should train the PSC members in order for them to understand that a PSC member has a responsibility towards the residents of the settlement which he/she represents. Such training would allow a PSC member to understand that it is vital to attend all meetings because decisions on development projects are made there that affect all residents of the settlement. The engineer also stated that the non-attendance of PSC members was sometimes the result of poor communication between members. For example, the chairperson of Makoko's PSC did not attend the first three meetings of the road-tarring project. It was later revealed that the chairperson had not received any of the notices stating the dates of the meetings. Note that no PSC members are paid for their involvement in projects.

Apart from the PSC, the BEC (Branch Executive Committee) is also involved in development projects of any nature in Makoko. The role of the BEC is similar to that of the PSC in so far as it represents the residents of the settlement concerned at meetings between engineers, the Representative Council and settlement representatives (see Section 2.9.5). However, the BEC is a political committee, since it represents the ruling political party (at present the ANC). It is also the only political party represented at such development meetings.

One can argue that due to the current sensitive nature of politics in South Africa, it would be more desirable to either have representatives of all political parties that are favoured by the residents of the settlement concerned at development meetings or none at all. Therefore, if all of Makoko's residents were to associate themselves with the ANC (as represented by the BEC), the BEC's presence at development meetings would not cause

dissent or factions. But, if another political party had strong support among the residents, the opposite might happen. According to the engineer involved, the BEC's presence at development meetings did not cause any problems during the previous development project. He did, however, state that political parties should not use development projects for political gain.

In order to test the residents of Makoko and Phameni's knowledge of the government structures involved in the development of their settlement's water supply, questions on this issue were included in the questionnaire. Residents were asked whom they considered to be in charge of their settlement's water supply. A total of 53% of the respondents indicated a local Makoko resident who is employed by a local construction firm. The former KaNgwane government's Department of Public Works hired this local firm to maintain the hand pumps and diesel pumps of Makoko and Phameni and to operate the valves of the water reticulation system. In 1994, the local DWAF offices hired the construction firm to do the maintenance. Consequently, the same individual was given the maintenance job he had previously held.

Respondents indicated that they assumed this local resident to be in charge of their water supply, because they often saw him working on the hand pumps of both settlements and operating the water pipe valves which regulate water to Makoko and Mashonisa (Makoko B). Some respondents said he often tells residents not to waste water by leaving taps open and he scolds children who play in the water. This has led to the belief that this person is responsible for the water supply to Makoko and Phameni.

The truth of the matter is that this man is only a caretaker of the local boreholes and has no authority over the distribution of water or over the upgrading of the water system. He is simply acting on orders from the DWAF officials. During an interview with him, he stated that he is aware that residents perceive him to be in charge of their water supply and that he is quite despondent about this. Residents assume that because he operates the water pipe valves and fixes the boreholes, he must be responsible when there is no water. Residents come to him to complain about their water shortages and blame him for their

dry taps but he has no authority to make any changes to the water distribution. He further stated that he often took it upon himself to tell residents not to waste water because there is already a shortage.

This person also says that he has seen the effect of private connections (see Section 3.2.2.1) on daily water supply from the Sabi River. According to him, the biggest problem is private connections made to the bulk water supply line of the settlements. These private connections cause the daily quota of water in the temporary reservoir to be significantly less (see Section 3.2.2.1). This is so because the households with these private connections have access to and use the water before it enters the temporary reservoir. Consequently Makoko starts every day with a water shortage.

Data from the questionnaire indicates that 21% of the respondents answered that they did not know who was in charge of their water supply. The rest of the respondents indicated a number of different senior local residents who also have no authority over water supply. It is interesting to note that only one respondent answered DWA and none answered the PSC, RC or DC. This indicates a lack of knowledge or understanding of the water provision and reticulation process for and in Makoko. This is a situation which definitely contributes to gross water wastage, serious water shortages and it impedes on any development in Makoko. This situation plus the incapacity of the PSC needs urgent attention before realistic development can take place in Makoko.

2.11 SUMMARY

The Mdluli of the northern Nsikazi district in Mpumalanga are a mixture of baPai, Swazi, Zulu and Nhlangu. The genealogy of the Mdluli begins with *Sikhulu* Silimanyama Mdluli who was born in Zululand. Around 1926, under the rule of Silimanyama's grandson, Jacob Mdluli, the Mdluli settled in the area where they still live today. Van Warmelo (File 33-35 1942: f 30) describes the area as "eNumbi ridge almost on the border of the Game Reserve". Jacob Mdluli's grandson, Mqoshwa Zephonia Mdluli, became *sikhulu* of the Mdluli in 1964. Mqoshwa Zephonia Mdluli died in 1998, during

the time when the research for this study was done, and his eldest son Izak Mdluli was appointed as successor.

The Mdluli adopted the traditional Swazi culture due to the strong Swazi influence on the non-Swazi people of the Nsikazi district over a period of time. King Ngwane III and his followers settled in the region today known as Swaziland in the mid-eighteenth century. Later, under the rule of King Mswati I these people became known as *emaSwati*. During the reign of King Mswati I, a number of Swazi princes and their followers moved out of Swaziland and settled in the former Transvaal and northern Natal. This exodus of Swazi princes from Swaziland is the reason for the great number of Swazi people living outside Swaziland's borders in South Africa.

The border between Swaziland and the ZAR was settled in 1866. Consequently, all the Swazi tribes and chieftaincies in South Africa fell under the authority of the Union of South Africa after 1910, and under the authority of the Republic of South Africa after 1961. The Swazi Territorial Authority, established in 1976, became the homeland of KaNgwane under the authority of the KaNgwane Legislative Assembly in 1977. The Nsikazi district formed part of the former homeland of KaNgwane. In 1993, the homeland of KaNgwane became part of the South African province of the Eastern Transvaal. The name of the province was changed to Mpumalanga in 1995.

The Mdluli tribal area consists of four settlements, namely, Makoko, Salubindza, Bekiswayo and Nyongani. The central authority within the Mdluli tribal area is vested in the *sikhulu*-in-council. The *libandla* (*sikhulu*'s council) consists of the *tindvuna* (ward headmen) of the four settlements as well as members of each *indvuna*'s own councillors. Apart from handling internal tribal politics, the *libandla* also assists the *sikhulu* in matters of the *sikhulu*'s court. The *sikhulu*'s court is managed by the *ndvunankhulu* (senior *indvuna*).

Each settlement in the Mdluli tribal area falls under the decentralized authority of an elected *indvuna*. In addition to keeping order and discipline within his settlement and allocating stands to the residents of his settlement, the *indvuna* also manages the

indvuna's court. The *indvuna*'s council, which is appointed by the *indvuna*, assists him in managing the *indvuna*'s court.

Stand sizes within the Mdluli tribal area are 30m × 25m. All resident stand owners pay a first time single payment of R100 *khonta* (to pay allegiance to) fees and thereafter an annual payment of R6 *khonta* fees. *Khonta* fees are symbolic of the residents' loyalty towards their *sikhulu*. *Khonta* fees are deposited into the Mdluli Tribal Account at the Magistrate's office at Kabokweni. Unmarried men and women are not allowed to live on their own stands since such a situation is believed to cause trouble in the form of "parties".

Statistics on the population density of the Nsikazi district indicate a fast-growing population. A total of 29.3 % of the rural population of the Nsikazi district is between 5 and 9 years of age. Statistics of this nature are common in developing areas. Statistics on income distribution indicate that 78.6 % of the entire Nsikazi district's population have no steady income. This is due to the fact that the Nsikazi district offers very few or no job opportunities and therefore residents are forced to practise subsistence horticulture.

The Nsikazi district's first water reticulation system was installed in 1979. This reticulation system was installed from the Crocodile River to Kabokweni in the southern Nsikazi area by the former Department of Development Aid. The northern Nsikazi district first received a water reticulation system from the Sabi River to five settlements in 1985/1986. This system was installed by the Department of Development Aid. In theory, 76.47 litres of water per person per day are pumped from the Sabi River to the residents of the northern Nsikazi district. In practice, however, residents receive much less (see Section 3.2.1).

Currently, extensive planning is being done for upgrading the water infrastructure in the Nsikazi district.

At the national and provincial government level, DWAF is the authoritative body involved in water projects in and for settlements in the Nsikazi district. At the local



government level, DC's, RC's, LC's, RDC's, PSC's and the RDP are the authoritative bodies involved in water projects of settlements in the Nsikazi district. The indigenous authority structure (the *sikhulu* and his *tindvuna*) in Makoko and Phameni has no official authoritative role regarding development (water) projects.

At the national government level, DWAF has the responsibility for ensuring that all South Africa's residents have access to basic water supply. DWAF's national policy states that DWAF has the responsibility to plan the expansion of water services in collaboration with provincial governments and to monitor and regulate water supply and sanitation activities. At the provincial level, DWAF acts as the water service provider to settlements within a given province until such time as the local authority of the settlement has the capacity to handle the technical aspect of water provision.

At the local government level, a district council is responsible for ensuring the provision of all services including water supply to settlements under its jurisdiction in a sustainable manner. DC's must also encourage the involvement of the residents of settlements under its jurisdiction as well as of community organisations of such settlements in matters of local government. DC's also act as the local authority for representative councils. One of the main aims of DC's is to build up the administrative and financial capacity of RC's so that the RC's can become autonomous.

RC's have a responsibility to represent the residents of their settlements at the local government level. The RC's has a duty to ensure the best services possible for the residents of its settlements through such representation. The main task of the RC is therefore to convey the (water) development aspirations of the residents to the DC.

A RC can develop into a LC as soon as it has the financial capacity. Unlike a RC, a LC has taxing powers and can therefore finance (water) development projects within its area of jurisdiction.

The RDC is a local settlement body and works closely with the relevant RC to convey each settlement's unique (water) development needs to the DC. The RDC compiles a

document stating the specific settlement's existing infrastructure and problems arising therefrom. The document also contains a priority list of all development needs within the specific settlement. An RDC thus performs its duty (preliminary planning and prioritising of projects) before a project is launched.

A PSC is a local settlement committee with the main function of ensuring a settlement's residents' involvement and approval of projects launched in such a settlement. A PSC thus performs its duty once a project is launched by informing the residents on all aspects of the (water) development projects, which ensures the residents' continuous approval till the end of the project. The PSC also has the task of ensuring that the local residents form part of the project's workforce.

The function of the RDP Commission is to ensure the existence of effective Reconstruction and Development Councils in rural areas of each province. The Reconstruction and Development Project Commission's task is to ensure that all water projects adhere to RDP standards in terms of quantity, quality, cartage, availability, and assurance of supply and upgrading.

During an interview with an engineer who was directly involved in a project to extend the water reticulation pipes in Makoko at the beginning of 1998, he indicated how the local government institutions function in practice. It was concluded that the constitutional mandate of Local Government, in this case the Lowveld and Escarpment District Council, to encourage the involvement of communities and community organisations in matters of local government is met. The existence and functioning of the PSC of Makoko ensures the involvement of community organisations. Furthermore, the Local Government Transition Act No 209 of 1993 stipulates that the representative council of a rural area must secure the best services possible for its inhabitants. This duty is fulfilled through the Representative Council's collaboration with the PSC of Makoko to determine the Makoko residents' priorities for water supply development.

However, it is the policy of the PSC to be representative of its settlement's unique infrastructural development needs in order to ensure that development projects of any



nature are to the residents' advantage and meet with their approval. It is concluded from two incidents during the water pipe extension project in Makoko that this function of the PSC of Makoko is not always carried out in a manner that satisfies the residents' needs. However, the concept of a PSC was only established after the national elections of 1994 and the functioning thereof is a new experience for all involved. The PSC's mistakes can therefore be explained as a lack of capacity which will improve as it gains more experience.

A further point worth noting is that the members of Makoko's PSC change with every new development project. This means that the experience that the PSC members involved in previous development projects gained in terms of conveying the details of the project to the residents of Makoko and conveying the residents' needs and suggestions to the engineers and the Representative Council, is lost. If this practice continues, the lack of capacity of the PSC will take longer to overcome than it would if the members (or at least some of them) were on the committee on a permanent basis.

Also, all PSC members do not attend all meetings between engineers, the Representative Council and settlement representatives. This might be related to a misconception about the responsibilities of a PSC member, which include attending all meetings because here vital decisions on development projects are made which affect all residents of the settlement. Non-attendance of PSC members is also the result of poor communication between members. PSC members receive no remuneration.

Data from the questionnaire further indicate that 21% of the respondents answered that they did not know who was in charge of their water supply. The rest of the respondents indicated a number of different senior local residents who had no authority over water supply. It was disturbing to note that only one respondent answered DWAF and none answered the PSC, Representative Council or District Council. This indicated that the people had very little knowledge about what happened in the development of their water supply.

CHAPTER THREE

WATER UTILISATION IN THE MAKOKO AND PHAMENI SETTLEMENTS

3.1 INTRODUCTION

This chapter describes the operation of the existing water facilities as well as the daily water utilisation patterns and practices of the residents of the two settlements where the research was conducted. This information serves as a basis to determine how the functioning of existing water facilities within a settlement influences the daily water utilisation practices of the residents. With this information, the effect of the current status of the two settlements' water systems on the residents' quality of life can be determined. It also gives a perspective on the manner in which the residents perceive water as a natural resource and their level of understanding of the concept that water supply is a service that has to be paid for (see Chapter Four).

3.2 THE STRUCTURE OF THE WATER SUPPLY SYSTEMS IN MAKOKO AND PHAMENI

3.2.1 The Northern Nsikazi Bulk Water Scheme

Both Makoko and Phameni, which are located in the northern section of the Nsikazi district, receive bulk water supply from the Sabi River in Mpumalanga via the Northern Nsikazi Bulk Water Scheme. This water scheme is currently still the responsibility of the Mpumalanga DWAF. As was mentioned in Chapter Two, bulk water supply to the northern section of the Nsikazi district was initiated in 1985/1986 under the government of the former homeland, KaNgwane, and the supply was then upgraded in 1994 by the Eastern Transvaal DWAF, now called the Mpumalanga DWAF (see Section 2.8.2).

Regional water supply systems such as the Northern Nsikazi Bulk Water Scheme tend to be a more economical option than cluster water schemes, which serve only a few settlements. Regional water schemes are developed to provide higher capacity to serve several settlements within a given region and where an adequate water source, such as the Sabi River, can be utilised (Sami and Murray 1998:6.20).

Bulk water supply in the Northern Nsikazi Bulk Water Scheme entails water reticulation pipes connecting the Sabi River to the settlements served by the Northern Nsikazi Bulk Water Scheme, but no reticulation pipe networks serving individual stands within these settlements. In other words, according to spokespersons from DWAF, the bulk water service provider extracts water from the river, sends the water through a cleaning process and pumps it to each settlement's reservoir. Here, the settlement's local authority is responsible for ensuring that the residents have easy access to the stored water by means of water reticulation pipelines serving settlement stand pipes.

The Northern Nsikazi Bulk Water Scheme provides eighteen settlements located within the Northern Nsikazi district with water from the Sabi River. Makoko and Phameni are the third and fourth last recipients among the eighteen settlements on the water reticulation pipeline, as they are situated approximately 25 kilometres from the Sabi River.

Makoko and Phameni have each been supplied by DWAF with one 10 000-litre plastic tank, which serves as a temporary reservoir. These temporary reservoirs are linked to the permanent reservoir at Numbi, which is one of eight permanent reservoirs within the area of the Northern Nsikazi Bulk Water Scheme. The pipeline from the Numbi reservoir to the temporary reservoirs of Makoko and Phameni is a gravitation line, which means that the water is not pumped to the temporary reservoirs but flows downward by means of gravitation along the contours of the geographic area. The implication of this is that the water flows to the temporary reservoirs for 24 hours per day. Each settlement's water reticulation pipeline is connected to the temporary reservoir located just outside the settlement. The residents of both Makoko and Phameni are supplied with water by means

of the water reticulation pipes via communal water taps located on street corners within the settlements.

According to an engineer directly involved in the water supply of the Northern Nsikazi Bulk Water Scheme, the temporary reservoirs' storage capacity of 10 000 litres is too small to provide the population of Makoko with the RDP minimum quantity of 25 litres per person per day (see Section 2.9.6). A simple calculation proves this statement. The estimated population figure of Makoko is 5 600 (see Section 2.6).

Thus:

$$5\,600 \times 25 \text{ litres} = 140\,000 \text{ litres}$$

This means that 140 000 litres of water are needed per day in Makoko.

According to the engineer, the actual volume of water that the residents of Makoko have at their disposal per day can be determined by the following calculations. The bulk water supply line provides the temporary reservoir of Makoko with water at an average flow rate. The average flow rate is indicated in litres per second.

140 000 litres needed per day in Makoko

$$\begin{array}{r} \div \quad 24 \text{ hours} \\ \div \quad 60 \text{ minutes} \\ \div \quad 60 \text{ seconds} \end{array}$$

1.62 litres per second

The water enters the temporary reservoir of Makoko at an average flow rate of 1.62 litres per second. The temporary reservoir can only store 10 000 litres of water. At present, there are about 40 government-installed taps in Makoko. The engineer states that each



tap is designed to yield water at a flow rate of 15 litres per minute. To determine how long it takes for the 40 taps to use the 10 000 litres of water, the following calculation is made for water usage during peak times, such as early morning when all the residents use water to prepare breakfast and wash and all the taps are open.

$$\begin{array}{r} 15 \text{ litres per minute per tap} \\ \div 60 \text{ seconds} \\ \hline 0.25 \text{ litres per second} \end{array}$$

$$\begin{array}{r} 0.25 \text{ litres per second} \\ \times 40 \text{ taps} \\ \hline 10 \text{ litres of water per second} \end{array}$$

The peak flow rate of water in Makoko is therefore 10 litres per second. The 10 000 litres water stored in the reservoir is therefore used in the early morning (peak time) at a flow rate of 10 litres per second.

$$\begin{array}{r} 10\,000 \text{ litres of water stored in the temporary reservoir} \\ \div 10 \text{ litres per second at peak flow rate} \\ \hline 1000 \text{ seconds before all the water stored in the temporary reservoir is used} \end{array}$$

$$1000 \text{ seconds} \div 60 = 16.6 \text{ minutes}$$

This means that when the residents start to use water early in the morning, they use the 10 000 litres of stored water in the temporary reservoir within 16.6 minutes. During the rest of the day the water flows into the reservoir and subsequently into the reticulation

pipes of Makoko at an average flow rate of 1.62 litres per second (see Section 3.2.1). Therefore, no water is stored in the temporary reservoir after it has initially been emptied each morning. The result is no water stored in the temporary reservoir to accommodate the upcoming peak times for water use during the rest of the day. Other peak times are mid-afternoon, when children come back from school, and early evening when the residents prepare supper (see Section 3.2.3.3). The temporary reservoir therefore only fills up again at night when the residents are asleep and no one uses water. The 10 000 litres of water that fill the temporary reservoir at night is then used again the following morning within 16.6 minutes. These calculations obviously do not include the reality of the effect that private connections have on the flow of the water in the main pipeline to the reservoir (see Section 3.2.2.1).

According to the engineer, this problem can only be alleviated by building a permanent reservoir with adequate water storage capacity for each settlement. Such a reservoir could balance the water level throughout each day. A permanent reservoir would refill after peak times and there would be sufficient water in the reservoir to accommodate the upcoming peak times of the residents' water usage for the rest of the day. The engineer states that residents would then have approximately 60 litres of water per person per day. DWAF plans to build permanent reservoirs to serve Makoko and Phameni individually, but, due to a lack of funds, this project is delayed (see Section 2.8.3.1).

The small water storage capacity of the temporary reservoir at Makoko is not the only reason why the residents do not have a permanent water supply each day. The installation of private connections by the residents of Makoko also contributes to the residents' daily water shortage.

3.2.2 Private connections

According to spokespersons from the DWAF offices in Nelspruit, a private/ illegal/ unauthorised connection refers to a water connection on a resident's stand for which the resident has not obtained a legitimate permit from the local government authority.

Before 1994, when the KaNgwane Government was still in power, according to spokespersons, permits for legal water connections from the bulk water supply line to individual stands were obtained in the following manner:

- A resident would go to the tribal office.
- The resident would pay a fee for the permit.
- Tribal Office officials would negotiate with the relevant KaNgwane Government departments to grant the permit.

In other words, the indigenous authority had the responsibility to obtain legal water connection permits for its residents.

According to DWAF spokespersons, since 1994, local government authorities such as district councils or local councils themselves have the right to grant permits for water connections from the bulk water supply line to individual stands within rural settlements. Indigenous authorities consequently no longer play a role in granting permits for so-called “legal” water connections to stands in their areas of jurisdiction.

According to a Lowveld and Escarpment District Council spokesperson, there is no current legislation that stipulates the legal procedure for obtaining permits for water connections on individual stands within rural settlements. This situation obviously creates confusion when one tries to determine whether residents have so-called private water connections (illegal) or legal water connections to their stands. Moreover, one soon gains the impression that there is no system to follow to acquire a permit for a legal connection.

DWAF spokespersons state that in theory, the current acceptable procedure to follow when applying for a water connection from the bulk water supply line to a private stand in a rural settlement is the following:

- Residents apply for a written permit and pay a connection fee at the offices of their local government authority (local council or district council). Each individual local authority determines the fee.

- The local government authority informs the local DWAF office of the resident's application and payment of a permit.
- The resident (applicant) consults with the local DWAF officials on the potential location of the planned water connection.
- DWAF officials inspect the potential location of the planned water connection to ensure that it does not fall within the area of an existing water pipe, and a final decision on the exact location of the water connection is made.

According to spokespersons from DWAF, one of two options can be carried out to make the water connection from the bulk water supply line to the resident's stand, if the DWAF officials approve the location of the intended water connection:

- The resident can decide to install the connection himself, if he has the proper knowledge of laying and connecting water pipes. (Spokespersons from the local DWAF offices were unclear on what specific qualifications such a resident would need and said that if the resident said he had the necessary knowledge it would suffice.) The entire process must be supervised by a DWAF official who advises the resident on issues such as water pipe sizes, where to lay the water pipes and how to make an effective connection between two separate water pipes.
- DWAF officials can make the connection for the resident. The resident does not have to pay DWAF for the connection because DWAF is only the water service provider (see Section 2.9.1). The local government authority (local council or district council) is the water service authority and is in charge of fees due for water connections, thus DWAF does not receive payment.

These procedures are not generally followed amongst residents of Makoko and Phameni, as is shown below.

To summarise, it can be concluded that the concept of a "private connection" refers to two things. Firstly it is a connection (from the bulk water supply line to a private stand) for which the owner of the stand does not have a legitimate permit from the correct authority. Secondly, it is a connection (from the bulk water supply line to a private stand)

that has been installed by the resident himself (or by someone employed by the resident who is not a DWAF official) and without DWAF's supervision. This means that private water connections from the bulk water supply line to individual stands are made without DWAF's knowledge or their approval. Obviously, the latter situation is bound to cause water system problems, due to, amongst other factors, poor water pipe connections, installed by unprofessional people, and the inappropriate locations of water pipes, such as where a bulk water pipe is already located.

Information about the existence of private water connections from the bulk water supply line to private stands within Makoko and Phameni was obtained by means of quantitative data, collected through questionnaires which were completed by 155 residents of both research settlements (see Section 1.5.3).

The quantitative data obtained in this study showed that residents of Makoko and Phameni started installing private water connections from the bulk water supply line to their stands in the late 1980's. The majority of residents with private connections installed the connections between 1992 and 1995. It is not known where the initiative came from, but spokespersons indicated that the practice spread by word of mouth from settlement to settlement. This practice clearly makes obtaining water much easier, as people do not have to walk to taps and carry heavy loads of water back home (see Section 3.2.3.3).

A total of 60.8% of the respondents to the questionnaire have water connections (private and legal) on their stands. Reasons given by respondents for installing water connections on their stands included wanting water close by to avoid daily trips to water points. Some respondents said they were told by fellow residents to make their own connections if they wanted water close to their homes. Others said they saw people from their settlement making these connections and decided to do the same.

According to Van Schalkwyk's report (1996:29), the creation of private water connections is motivated by a perception that they produce a more secure water supply. Spokespersons from Makoko and Phameni said that their reasons for installing water

connections to their stands were not necessarily that doing so would ensure a more secure water supply. Their main reasons were a need to avoid long queues at water points, the reduced walking distance to water points and a desire for convenience and comfort.

A total of 40% of the respondents to the questionnaire who had water connections on their stands indicated that they had legal permits for the connection. A further 11% of the respondents who had such connections indicated they did not and 49% indicated they did not know whether they had legal permits for their water connections.

The quantitative data on the procedure followed by respondents to obtain permits for water connections to their stands showed little correspondence. From all the different answers given in the questionnaire, it could be gleaned that the following procedure to obtain a permit for such a connection was generally followed by the majority of the residents:

- The resident would visit the tribal office where an amount of R20 was paid and a letter was received stating that permission from the *sikhulu* for the resident to install a water connection on his/her stand had been obtained.
- The resident then visited the Magistrate's office at Kabokweni where the letter from the *sikhulu* was certified with a stamp.
- The resident then visited the DWAF offices in Malekuthu, where a stamped letter was given to him/her stating that the resident had applied for and received a permit to install a water connection to his/her stand. According to spokespersons, officials at the DWAF offices would also inform the residents of which DWAF employees would make the water connection to their stand for them. It appeared that DWAF personnel had installed very few of these connections.

As for the procedure followed by residents to install water connections to their stands, the data from the questionnaire showed the following: A total of 71.5% of the respondents with water connections to their stands had either made the water connections on their stands themselves, or had paid someone from their settlement or a neighbouring settlement to install the water connections. No involvement by DWAF officials, or any

other government department officials, during the installation of these water connections was mentioned by these 71.5% of the respondents.

According to spokespersons from Makoko and Phameni, residents install a water connection to their stands by linking a private water pipe, usually a “HDPE” (high density polyethylene) pipe (the cheapest option), to the government-installed water pipelines in the settlement. A hole is punched in the “government water pipe” using a pick or a similar tool and the private water pipe is simply attached and laid underground to the resident’s stand. The joint is sealed with car tubing tied with wire. Van Schalkwyk (1996:60) reports similar practices. A tap is then attached to the end of the private water pipe (see Figure 1).

Interviews with the residents of Makoko and Phameni showed that it is common practice for neighbouring households to form groups and to share the cost of equipment needed for the initial water connection to the “government water pipe”. Every household in the group gives an amount of money to a person elected from the group. This person makes the trip to town and buys the “group water pipe”. Members of the group either make the connection to the government pipe themselves or the group pays someone from the community with knowledge of plumbing to make the connection. The “group water pipe” is then routed to a jointly chosen location and from there every household links up its own private water pipe and installs a connection from this pipe to individual stands.

The quantitative data of this study shows that the size of groups that residents form to share costs in such instances varies from two to twenty households, but, most commonly, varies from between four to ten households per group. The data shows that the average amount paid per household for the “group’s water pipe” as well as the individual stand’s pipe and tap is between R150 and R250. This immediately raises more questions about the official statistics on income in the Nsikazi district (see Section 2.7).

According to spokespersons, when members of a group hire a person from outside to make the water connections to their stands, this person is paid with money from the

group's communal fund. When the group makes the connection itself, it is because the group does not have sufficient funds to pay someone else with knowledge of plumbing.

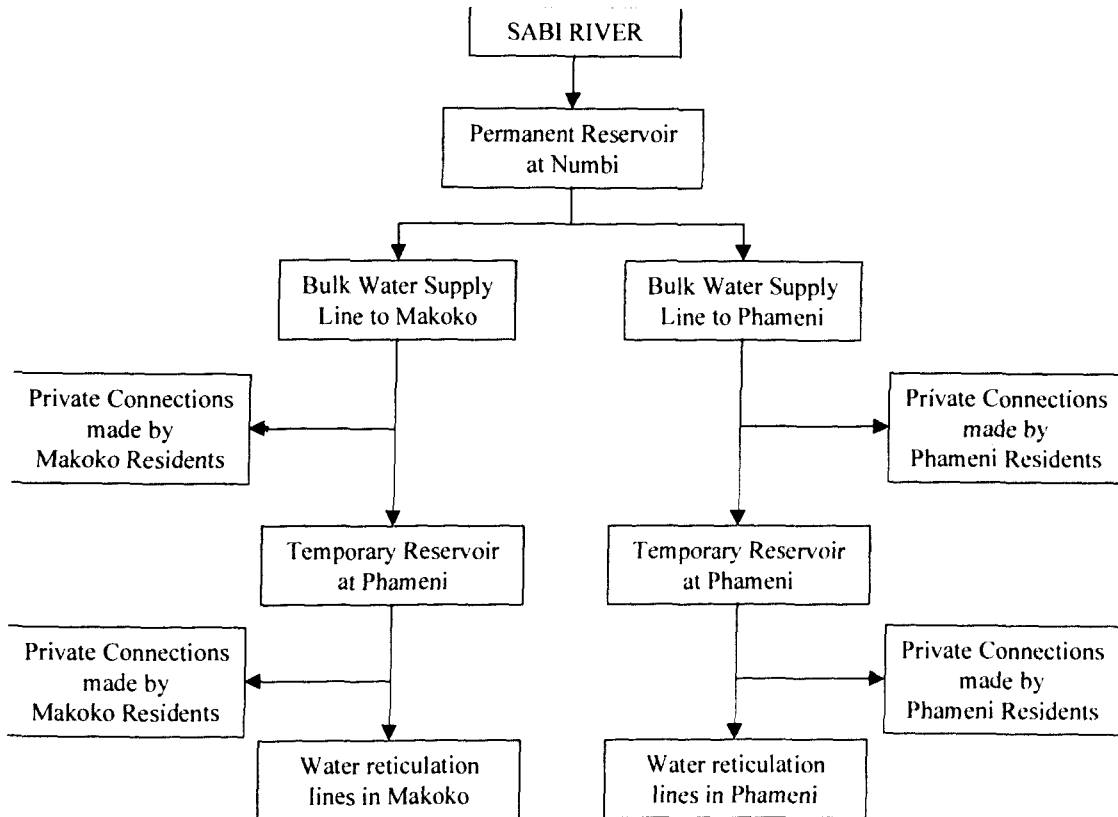
Probably the most important conclusion derived from the above information is that, although some residents made some sort of application for a water connection to their stands, whether to the correct authority or not, most of the respondents made the connections themselves. Respondents made these water connections without the help or supervision of the relevant government departments. Thus, the absolute majority of stand water connections in the two research settlements can be classified as "private connections" because the installation thereof was most probably unapproved.

Answers to the questionnaire used in this study showed that there was confusion amongst the residents of Makoko and Phameni about whether the water connections on their stands were private connections or not. A total of 65.4% of the respondents with water connections stated that they did not have private connections, 27.3% answered they did have private connections and 7.3% answered that they did not know whether they had private connections. In the interviews, spokespersons indicated that the negative connotation linked to the concept of "private connection" may have influenced the residents' answers about whether they had a private connection or not – they would rather not admit to having a private connection or said they did not know whether they had private connections.

The questionnaire also showed respondents that gave a negative description of the term "private connection". Most respondents answered that it meant "stealing water" or "taking water from the government". Others answered: "The government won't help us, so we make a connection ourselves". Some respondents simply answered that they did not know what a private connection is. It can therefore be concluded that those respondents who had heard of a "private connection" perceived it as something negative directed towards the government. Respondents also perceived a private connection as something one did as a result of the disinterest of the government towards residents' well-

being and the government’s unwillingness to help improve the respondents’ water shortage situation.

Figure 3.1 Diagram of the bulk water supply line of Makoko and Phameni



According to the report by Sami and Murray (1998:15), private connections are directly linked to a lack of community participation in government decisions about water reticulation. When water systems are installed in a settlement without proper prior community consultation with regard to the source option, the level of service provided and so forth, residents often do not have a sense of ownership towards the water supply system. As a result, the system can be subjected to the installation of private connections, which cause severe pressure losses within the specific settlement’s water supply system. This was also found to be the case in Makoko and Phameni.

3.2.2.1 The consequences of private connections

Private connections within the Northern Nsikazi Bulk Water Scheme are a major source of problems to the DWAF officials in Nelspruit. As mentioned in Section 3.2.1, the inadequate storage capacity of the temporary reservoir of Makoko causes residents to experience daily water shortages from the water reticulation system simply because of its inadequate capacity. The installation of private connections to stands aggravates this existing water shortage.

The residents of Makoko and Phameni install their private connections either to the bulk water supply line to the settlement or alternatively to the water reticulation line within the settlement, depending on the location of their stands. The bulk water supply line is the water pipe that connects the permanent reservoir at Numbi to the temporary reservoir of each settlement. The reticulation line of a settlement is the internal pipe network of a settlement linked to the temporary reservoir of the settlement. Some of the stands located closest to the bulk water supply line have private connections installed to this bulk water supply line. Some of the stands located deeper within the settlement have private connections installed to the water reticulation pipe lines of the settlement.

According to an engineer directly involved in the water supply to Makoko, the private connections linked to the bulk water supply line cause the most problems. The bulk water supply line is the source of the water that flows into the temporary reservoir from where it is channeled into Makoko. In other words, residents with private connections linked to the bulk water supply line have access to the settlement's daily quota of water before the water reaches the reservoir. The result is that residents with private connections linked to the bulk water supply line have a permanent water supply (see below). The remaining residents of Makoko start each day with the 10 000 litres of water flowing into the temporary reservoir minus the volume of the water used by the residents with private connections linked to the bulk water supply line.

According to the engineer, it is currently not possible to calculate the volume of water that residents with private connections to the bulk water supply line use per day because

these private connections are not linked to water meters. The fact that these residents have a permanent water supply through their private connections indicates a significant loss to the water stored in the temporary reservoir, with a further negative impact on the security of water supply in Makoko.

The engineer further explained that the private connections linked to Makoko's internal reticulation pipeline do not necessarily decrease the daily volume of water at the residents' disposal. Makoko's water reticulation system was originally designed to accommodate upgrading to individual stands (see Section 2.8.2). Therefore, if the private connections linked to the reticulation line were professionally done, the reticulation system would, at least in theory, operate normally.

As was explained in Section 3.2.2 above, many of the private connections that exist within Makoko and Phameni were made by the residents themselves or by someone employed by the residents and not by DWAF officials or under DWAF supervision. The fact that professional plumbers from the relevant government departments do not, as a rule, install the private connections results in continuous pipe leakage. According to spokespersons from the DWAF offices in Nelspruit, pipe leakages in the Northern Nsikazi Bulk Water Scheme cause the loss of hundreds of litres of water per day. The report by Van Schalkwyk (1996:60) indicates that water losses due to private connections in the rural settlements of South Africa can be up to 100% of the volume of water supplied to rural settlements.

Data from the questionnaire showed that a total of 34.7% of private connections of respondents in Makoko and Phameni did not yield any water at all. A total of 52.6% of private connections of respondents in Makoko and Phameni usually provided water between two and eight days per month. Only 12.7% of private connections of respondents in Makoko and Phameni provided water on a daily basis.

The private connections that yield water on a daily basis are those connected to the bulk water supply line of the settlement and those that are topographically lower down than other private connections. The weak downflow of the water is sufficient to keep the latter

private connections flowing most of the time. The researcher's qualitative research shows that households with this permanent water supply serve as a close water point to neighbours and have up to 50 people fetching water from their taps every day. Members of these households said they did not mind others using their taps because water is free for all. They did, however, experience damage to their taps caused by the many people coming into their stands. Neighbours were not expected to pay for repairs.

According to spokespersons of the remaining private connections, their water supply is erratic. In other words, residents do not know when to expect water from their private connections from day to day. Due to this fact, residents have come up with the solution of keeping their taps open at all times with a bucket underneath to collect any possible water. Spokespersons said that when the water flows at night they sometimes wake up from the noise and that they then fill more than one bucket if needed.

The poor water supply of Makoko and Phameni's water reticulation systems consequently results from the following:

- The water storage capacity of 10 000 litres of each settlement's temporary reservoir is inadequate to provide residents with the RDP minimum quantity of 25 litres per person per day (see Section 3.2.1).
- The private connections made to the settlement's bulk water supply line reduce the volume of water flowing into the temporary reservoir.
- Poorly constructed private connections to the reticulation pipes of the settlement result in pipe leakages, which cause the loss of immeasurable quantities of water per day.
- There is no official control over the installation of private connections, and thus also no official control over water lost due to poorly made connections.

The situation regarding private connections in Phameni is similar to that described in Makoko.

3.2.3 Boreholes

Makoko and Phameni residents have access to groundwater by means of hand pumps and diesel pumps located within the two settlements.

Although there is apparently little groundwater in the Nsikazi district (see Section 1.4.1), there are boreholes for extracting this water from underground sources. Boreholes are an economical water source, due to the low capital costs involved and the relatively short time needed to develop a borehole scheme. Depending on the scale of the project, a borehole scheme can be developed within a period ranging from two weeks to three months (Van Schalkwyk 1996:34,35). According to spokespersons from a consulting engineering firm, the cost effectiveness of boreholes is further influenced by water quality. If, like in Makoko and Phameni, the undergroundwater is not polluted, the water does not have to undergo a cleaning process. Consequently, this reduces the cost of water supply via boreholes because the water can be used immediately.

The five boreholes located in Makoko and Phameni are equipped with three hand pumps and two diesel pumps respectively. Diesel pumps are normally installed where the water yield is high (between 3 litres per second and more than 10 litres per second), but can be installed where there is a lower yield than 3 litres per second (Van Schalkwyk 1996:34,35). Hand pumps are usually installed where there is a lower yield (0.5 litres per second) (Van Schalkwyk 1996:34,35).

Makoko residents have access to one hand pump, located in Makoko A, and two diesel water pumps, one in Makoko A and one in Mashonisa (Makoko B). Phameni residents have access to two hand pumps. According to the data gathered by the questionnaire, close on 60% of respondents from Makoko and Phameni make use of borehole water on a daily basis.

Thus, at the end of 1999, the situation in Makoko and Phameni meant that the majority of households had a private connection which erratically provided water to their stands. Members of the household had to fetch water on a daily basis from the closest water point

(boreholes, a neighbour's working private connection or a street tap). This is an indication of the inadequacy of the current water reticulation systems of these two settlements.

3.2.3.1 Diesel pumps

An employee from the regional DWAF offices (who is also a resident in the settlement concerned) operates the diesel pumps. The "pump operators" are usually men who were employed by the former KaNgwane Department of Public Works. These men retained their positions as pump operators in their settlements when the present South African Government came into power in 1994 and when the regional offices of DWAF replaced the Department of Public Works.

A diesel water pump is located underground and its motor is located above ground in a corrugated iron pump house with a roof to prevent damage to the pump, motor and control devices by wind, rain or vandalism. It is always necessary to house pumps where the power source is a diesel or petrol motor (Sami and Murray 1998:12.44). A free-standing 2 000 litre plastic water tank is connected to the diesel pump and stands next to the corrugated iron pump house. Residents obtain water from the connected tank by means of a tap connected to the tank (see Figure A2).

In Mashonisa (Makoko B), the diesel pump and water tank are located in an open field relatively close to all residents. In Makoko A, the diesel pump is connected to two 2 000 litre plastic water tanks located next to each other. Obtaining water from these water tanks is more effective and faster than using a hand pump, because there is a tap (the water flows due to gravity) instead of a lever that has to be operated manually.

Pump operators must ensure that the 2 000 litre plastic water tanks which are connected to each diesel pump and from which residents fill their containers with water are full at all times. The pump operator starts the diesel pump at 7:30 every morning and keeps it running until the connected water tank is filled with water. The pump operator then switches the pump off until such time that the tank needs to be filled again. This process

continues throughout the day until 4:30 PM, when the pump is finally switched off for the day.

Employees from the regional DWAF offices at Malekuthu service these diesel pumps. The pump operator must inform the DWAF regional office of any repairs needed to the diesel pump. The DWAF office sends an employee to repair the pump as soon as possible. Pump operators reported that diesel pumps are usually repaired within three days after a problem has been reported.

3.2.3.2 Hand pumps

Hand pumps in Makoko and Phameni have a helical rotor which turns in a fixed groove. These hand pumps are unlike conventional single action reciprocating piston pumps, which only deliver water on the downward stroke, because the rotary screw hand pumps continuously deliver water as the actuator is turned. The rotary pump is designed in such a way that, with every complete turn of the handwheel, the pump turns more than once. Thus the manual effort to produce water using the rotary pump is less than the effort needed to produce water using a piston pump. The rotary pump operates on the principle of increasing the pressure of the water by creating a progressive cavity that screws the water in the direction of flow and delivers water in a steady stream (Van Schalkwyk 1996:38).

The Mono hand pumps used in Makoko are examples of such rotary hand pumps. Mono hand pumps are commonly used throughout South Africa. These hand pumps eliminate the need for plungers and seals because they utilise a rotary motion to lift water (Sami and Murray 1998:12.33,36). Mono pumps can successfully pump water with a significant sand load without producing pumped water that contains sand particles (Sami and Murray 1998:12.33,36).

Two different versions of the rotary screw hand pump are used in Makoko and Phameni: a single bar and a double bar version. The single bar is turned in a circular motion with one or both hands (see Figure A3). The double bar hand pump is designed to be operated

with both hands using a motion similar to that performed with the legs and feet when one rides a bicycle. However, residents do not operate the double bar hand pump in the way it was designed to be operated, but usually turn only one of the two bars with both hands to pump water. The reason why residents operate the double bar hand pump “incorrectly” is that the hand pump can be operated much faster when only one bar is turned with both hands, and water is produced at a stronger flow rate. Another reason is that children and petite women cannot turn both bars simultaneously with ease because their arms are too short.

3.2.3.3 Fetching water from boreholes

The task of fetching water from a water point, such as a hand pump or diesel pump point, traditionally falls to the women in a household. The mother and daughters take turns performing this daily chore, although young children of both sexes are often sent when the older women are busy with other domestic tasks such as collecting firewood (see Figure A4). The distance that each household’s residents walk to the nearest water point obviously depends on how far the stand is located from the water point. Measurements done by the researcher on foot produced a rough estimate of a maximum distance of one kilometre (return trip) and a minimum distance of roughly 30 metres (return trip).

Water is collected in 20 litre and 25 litre plastic containers, which have a small opening on top of about five centimetres in diameter. These containers, previously used for storing liquid soap, cost R10 each and are bought pre-cleaned in Hazyview and Whiteriver at various places, such as restaurants. Spokespersons say these water containers are popular because they can easily be transported on people’s heads or on a wheelbarrow without water spillage (see Figure A5). Els (1996: 257-258) also discusses this practice.

The water containers are carted to and from the water points in a wheelbarrow, which costs approximately R170 (see Figure A5). When a household’s wheelbarrow breaks, which often happens, since it is used every day, the heavy water containers are carried home on the head until such time as the household can afford to buy a new wheelbarrow.

Most respondents to the questionnaire report filling three water containers during one trip to the water point, as one wheelbarrow can transport three containers at a time (see Figure A5).

Data from the questionnaire indicate that:

- 32% of respondents make one trip to the water point per day;
- 29.4% of respondents make two trips to the water point per day;
- 29.8% of respondents make three trips to the water point per day;
- 7.6% of respondents make four trips to the water point per day; and
- 1.2% of respondents make five trips to the water point per day.

Spokespersons say that the number of trips per day depend on the size of the family and the consequent amount of water needed.

Surveys done in the Thabamooopo district of Lebowa show that two to three trips per day are made by residents to water points. The number of trips made per day is reported to be related to the walking distance, water availability and queuing time at the water point (Van Schalkwyk 1996:47).

In KwaZulu Natal, Van Schalkwyk (1996:47) found that accessibility tended to reduce the need for home storage of water since trips are made to collect water as it is required. The incidence of home storage of water is limited in Makoko and Phameni to those residents living farthest from water points, and who consequently store water, but mainly for early morning use.

The report by Van Schalkwyk (1996:38) states that the two peak times for fetching water are early morning and late afternoon.

Data from the questionnaire show that most of the women in Makoko and Phameni fetched water between 6 am and 7 am and again between 2 pm and 3 pm or between 4 pm and 5 pm. Reasons given by the respondents for the preference of these times include that, in the early mornings, a lot of water is needed in the household for cooking and

bathing. It is also the coolest time of day. In the mid-afternoon (2 pm to 3 pm) children usually fetch water after school or they look after small children while the mother goes to fetch the water. In other words, afternoons are a convenient time of the day to fetch water, because there are more family members at home to help with the chores. Late afternoon is again a cooler time of the day and water is needed for the evening's cooking and bathing.

Naturally, there are queues at the water points at the preferred times. Residents of Makoko reported that there are queues at the water points 80% of the time and that they wait for between one and two hours for their turn at the water point, especially in the early morning. Early morning (between 6 am and 7 am) tends to be the busiest time at the water point because everybody in the settlement needs water for eating and washing before they can start the day at around 8 am. Residents of Phameni, which has a much smaller population figure than Makoko (see Section 1.3), also reported queues at water points but they usually wait for between 30 minutes and one hour. Queues tend to be longer over weekends because the residents who work outside the settlements are at home and consequently more water is used.

The daily task of standing in a queue at the water point for a few hours does not appear to be something residents loathe, and is usually accompanied by a great deal of chatting and laughter. Schoolchildren especially seem to enjoy this after-school get-together at the water point. Fetching water is, in fact, so much part of the residents' lives that their daily routine revolves around it and it creates an opportunity for the women to socialise at the water point. Despite the social function that the water point serves, neither women nor schoolchildren are seen lingering about after their water containers have been filled. They go straight home to finish the tasks of the day.

3.2.4 Private water tanks

Residents with a higher than normal income in Makoko and Phameni, such as taxi owners and teachers, often install private water tanks on their stands. One such household in

Makoko owns a 1 000 litre plastic tank, bought at White River in 1995 for R1 600. The tank is kept full by means of a hosepipe attached to the stand's private connection (see Figure A6), which, according to the resident, provides water on an almost daily basis (see Section 3.2.1 for detail on regularity of water supply). The spokesperson said her husband had bought the tank because he did not want her to make trips to the water point. She said her husband did not approve of other residents using the tank as a water point because they had not helped to pay for it.

In this particular case, the water tank serves as a status symbol because the husband perceives the chore of fetching water at a water point as something that is beneath his wife's status and is unnecessary. It is interesting to note that this particular house has a distinct western (untraditional) look, and is built of brick in a conventional western style with a flower garden. The household also does not own cattle, goats or chickens.

However, water tank owners' private connections do not always provide water on a regular basis. In one particular case, a resident owns a tin water tank, bought in 1984 for R300. The stand's private connection usually provides water one day in the week only, and on that day the tank is filled by means of a hosepipe connected to the stand's tap. According to the resident, she installed the water tank because she works full time and does not have time to fetch water for the household. She said that her neighbours made use of her tank to fetch water for their own households and that she did not mind, because water is free for all people in Makoko (see discussions on the residents' value judgements about water in Section 4.6). In this case, it can be concluded that the water tank was purchased purely for practical reasons and not as a status symbol.

3.2.5 Natural springs

Makoko has another source of water in the form of a natural fountain (or spring), located within Makoko C, the smallest part of Makoko. The fountain occurs as a distinct "eye", approximately 1.5 metres in diameter. A spring or fountain appears where the

underground surface of groundwater intersects the surface and is commonly found in rolling topography, incised with water courses (Sami and Murray 1998: 9.1).

Water from this fountain in Makoko C is used only by the handful of households that are situated around it. The residents who use the fountain as a daily water point scoop the water up with a shallow dish and pour it into a larger container, which is then carried home (see Figure A7). This process obviously takes much longer than fetching water from a hand pump or diesel pump, and is not worthwhile for residents who live far from the fountain. The process of scooping water limits the volume available to households to about 5 to 10 litres per person per day, as it takes much longer than fetching water from a borehole or a tap (Van Schalkwyk 1996:36).

A fountain needs to be protected to prevent water contamination as a result of, amongst other factors, the poor sanitation facilities common to rural areas (Sami and Murray 1998:6.18). A corrugated iron sheet that protects the water from inflowing impurities encircles Makoko's fountain. The water from the fountain in Makoko is opaque with a greenish colour and contains visible organisms. Frogs were also seen in the fountain. Spokespersons from Makoko said that the occurrence of frogs in water is perceived as an indication of cleanliness, as they believed the frogs' urine makes the water taste sweet.

Apart from the water's appearance, the hygiene of the fountain is doubtful because it is not fenced off and spokespersons said that both animals and humans drink directly from the fountain. Spokespersons in Makoko agreed that the fountain's water is probably not very clean, but to those residents living close by, the conveniently short distance to the fountain is the decisive factor for making use of it.

3.2.6 Rainwater

Data from the questionnaire showed that 63% of respondents from Makoko and Phameni use rainwater for domestic purposes. Residents can store only limited volumes of rainwater, as only makeshift collecting facilities are used. Spokespersons revealed that rainwater is collected by placing plastic basins under gutters and the edges of corrugated

iron roofs during rainstorms. Residents who have houses with corrugated iron roofs benefit more from this alternative water source than residents with thatch roofs. Water of “relatively pure” quality can be collected from corrugated iron roofs, while water collected from weathered thatch roofs has a “significant debris load” and is not always potable (Sami and Murray 1998:10.1).

Van Schalkwyk (1996:50) states that the practice of rainwater harvesting is significant in areas where other sources of water are not reliable and water shortages often occur. As discussed above, the water reticulation supply in Makoko and Phameni is unreliable and it can thus be assumed that this unreliability contributes to the practice of rainwater harvesting.

A rainstorm producing 8 mm of water is required to yield sufficient water to meet the needs of an average family for 3 to 4 days (Van Schalkwyk 1996: 50). In Makoko and Phameni, rainwater is considered a bonus on top of the water supplied through the other sources. Residents do not necessarily rely on rainwater to fulfill their domestic water needs, although it makes a welcome contribution.

Spokespersons in Makoko and Phameni said that rainwater is used for all kinds of domestic chores as well as for drinking. Some spokespersons said that they like to wash white garments in rainwater, since it does not turn the washing brown as water from other sources, especially from the Sabi River during the rainy season, often does.

Collected rainwater is stored in water containers of various sizes in the yard, but is always used within three days, since spokespersons said that after this period the water contains larvae and is not considered safe to drink. Algae, bacteria and insect larvae eventually occur in stored rainwater because dead leaves, dust and bird droppings, which accumulate on roofs with time, contain the essential nutrients for such organisms to grow (Sami and Murray 1998:10.1). According to spokespersons, rainwater is not perceived to be cleaner or safer to drink than water from any other source.

3.3 WATER LOSS

According to Van Schalkwyk (1996:59), water losses are caused by poor maintenance of water distribution facilities. This situation is aggravated when the water distribution facilities are in a poor condition. The extent of water loss is difficult to determine in areas where there are no water metering facilities (Van Schalkwyk 1996:59).

The biggest cause of water loss in developing areas is poorly made private connections (Van Schalkwyk 1996:61). The crudely made “HDPE” (high density polyethylene) pipe connections can be responsible for as much as a 100% loss of the volume of water supplied (Van Schalkwyk 1996:61). As discussed above, private connections are very common in Makoko and Phameni and create many problems for DWAF due to the water loss experienced.

As Makoko and Phameni have no metering facilities, the extent of the two settlements’ water loss through private connections cannot be determined. Therefore, spokespersons from DWAF could not give specific figures of water loss in Makoko and Phameni.

The occurrence of water puddles at water points is common throughout Phameni and Makoko. All communal water points tend to have a puddle of quite a significant size during the day. At hand pumps these puddles are the result of the pumped water’s dwindling flow, which occurs when the bar ceases to be turned and containers have been removed. At the taps of diesel boreholes, the puddles result when residents keep the water tap running while filling different containers and when residents switch places to fill containers. Water also goes to waste when residents rinse containers before filling them. A significant amount of water is wasted in this manner, since water points are used throughout the day.

According to Van Schalkwyk (1996:59), the volume of water lost at street taps in several villages in Venda was about 10% of the volume supplied by the water supply system or about 2 litres per person per day. The report by Van Schalkwyk (1996:59) states that in areas where water shortages often occur, taps are left open at all times to alert residents

when the water is available and this leads to water losses in excess of 10%. The practice of leaving taps open occurs in both Makoko and Phameni, as discussed above (see Section 3.2.2.1). Huge volumes of water are wasted, especially at night when the water suddenly becomes available through the taps (see Section 3.2.2.1). It takes some time until residents realise that water is flowing and fill their containers.

3.4 PATTERNS OF WATER UTILISATION IN MAKOKO AND PHAMENI

3.4.1 Domestic water utilisation

Domestic chores performed every day involving water utilisation include cooking, bathing and providing drinking water for the household's animals. Information regarding the amounts of water used by the residents of Makoko and Phameni for each particular chore was obtained by means of quantitative research (see Section 1.5.3).

3.4.1.1 Cooking and drinking water

The quantity of water used for cooking by residents of Makoko and Phameni differs from household to household, depending on the number of family members. The approximate daily quantity of water per household used for cooking is ten litres per day. Studies done by Van Schalkwyk (1996:14) to determine the volume of water used for cooking amongst residents of developing areas or "communities having a very low level of living" indicate that the average volume is 1.5 litres per person per day³.

³ The concept "very low level of living", as described in Van Schalkwyk's report (1996:14), is one section of a value orientation scale ranging from "subsistence" to "very high". The latter refers to expensive Western style houses whilst the former refers to "limited traditional untreated cement blocks" not unlike the dwellings found in the two research settlements. Other factors determining the level of living include income, education, population, business activity and household size. The water demand of people from each level is then determined on the basis of these factors. Although the aim of this study and Van Schalkwyk's report (1996) are not similar, the comparison drawn between Van Schalkwyk's scale's "very low level of living" section and Van Schalkwyk's study's residents' water utilisation practices serve as a useful guide to compare the residents from the research settlements' water utilisation practices with those of Van Schalkwyk's report.

Data from the questionnaire indicate that the average household size of respondents in Makoko and Phameni is 7.5 members. If the volume of ten litres per household per day, as used for cooking by residents of Makoko and Phameni, is converted to litres per person per day, the usage comes to 1.3 litres per person per day. The volume of water used by the residents of Makoko and Phameni for cooking is therefore very close to the average volume used for cooking by residents of developing areas in other parts of South Africa.

Data from the questionnaire also show that five of the ten litres of water used for cooking by the respondents in Makoko and Phameni are used for cooking porridge. The remaining five litres of the water is used for cooking vegetables and making tea. According to spokespersons, the average resident drinks about three cups of tea per day, and children drink instant cold drink. During the hot summer months, residents who own refrigerators keep a jug of water in the refrigerator for drinking water. It is common practice to offer visitors a glass of ice cold water, and the researcher was often treated to this welcome refreshment.

The residents of Makoko and Phameni do most of their cooking on a wood fire, either in the open yard or in a separate hut on the stand used only for this purpose. The residents themselves gather firewood in the fields. According to spokespersons, it is primarily the women and children who perform the chore of gathering firewood. Some residents' homes have a kitchen as part of the main house and all cooking takes place there. This new practice stands in contrast to the traditional separate cooking hut and is an example of acculturation towards house-building patterns in the western style.

Spokespersons found it difficult to indicate the exact volume of water a person drinks per day. They often drink water directly from the water source and are not sure how much water they drink. Studies undertaken to determine the volume of water used by humans for drinking, regardless of value orientation or home environment, indicate 1.5 litres per person per day (Van Schalkwyk 1996:66). These studies were done, *inter alia*, amongst people in KwaZulu-Natal and the black population of Cape Town.

3.4.1.2 Dishwashing

Dishes are washed in a small plastic basin and, according to the data gleaned from the questionnaire, residents use 7.5 litres of warm water per day. Residents of Makoko and Phameni who have western-style kitchens wash their dishes in a built-in sink. The sink is not connected to a water tap and has to be manually filled with warm water. Spokespersons reported using commercial dishwashing liquids such as Sunlight Liquid.

Studies done to determine the volume of water used for dishwashing by households with a “very low level of living” (see Footnote 3) indicate that about 2 litres per person per day is used (Van Schalkwyk 1996:67).

If the average household size of Makoko and Phameni is 7.5 members, the volume of water used for dishwashing (7.5 litres per household) is 1 litre per person per day.

The studies referred to in Van Schalkwyk's (1996) report thus indicate a slightly higher average volume of water used for dishwashing in developing areas of South Africa, in comparison to that found among the residents of Makoko and Phameni.

3.4.1.3 Personal hygiene

Van Schalkwyk (1996:69) indicates that the volume of water used for personal hygiene amounts to more than 50% of the total water demand of the domestic water user.

Data from the questionnaire indicated that in the summer months, due to the extreme heat, respondents in Makoko and Phameni often bath two to three times a day. During the cooler months, everybody bath once a day. Bathing takes place in the house, usually in a small room used only for this purpose. People bath in a plastic basin, which is filled with warm water and soap.

Studies done by Van Schalkwyk (1996:69) indicate that the residents of settlements with a “very low level of living” (see Footnote 2) use on average about 14 litres per person per day for bathing.

The questionnaire provided data which suggest that some households' members use ± 5 litres of water per person per bath while others use ± 20 litres per person per bath, depending on the size of the basin. If the volume of water that the residents of Makoko and Phameni use for bathing per person per day is determined and compared to Van Schalkwyk's (1996:69) findings of 14 litres per person per day, the result is the following:

- If the average volume of water used per bath is taken at 12.5 litres and the average number of baths per person per day is two, the average volume water used for bathing is 25 litres per person per day.
- With the average household population estimated at 7.5 persons per household, it is estimated that the volume of water used for bathing equals 187.5 litres per household per day.

The average volume of 25 litres per person per day for bathing in Makoko and Phameni is significantly higher than Van Schalkwyk's (1996:69) estimated average volume of 14 litres per person per day. However, if the situation is viewed realistically, the facts are the following: the minimum volume of five litres per person per bath, can become 15 litres per person per day during the summer months, when residents of Makoko and Phameni bath three times per day. During the winter months, when residents bath once a day, the maximum volume would be 20 litres per person per day. It is only when the maximum volume of 20 litres per person per bath becomes 60 litres per person per day during the summer months that the volume of water used for bathing by the residents of Makoko and Phameni seems excessive in comparison to Van Schalkwyk's (1996:69) volume of 14 litres of water per person per day.

3.4.1.4 Animal water use

According to spokespersons, cattle and goats are taken by their owners to nearby water streams on a daily basis to drink. Water for cattle and goats is not included when determining the daily water consumption per household. According to spokespersons, if

streams do not flow due to extreme drought in the winter months, the cattle and goats need to be given about 200 liters of water per household every day by their owners.

According to spokespersons, pigs are kept in pens on the owner's stand and are given an average of about 10 litres of water per pen daily. Chickens are kept loose on the stand or in pens and are given an average of about five litres per pen per day. Chickens that are not kept in pens often drink water from the puddle formed under the stand's tap or from a plate or even a rubber tyre, cut in half, which is permanently kept under the tap. Dogs and cats also get their drinking water from this makeshift water point or are given an average of about one litre communal drinking water per day. The total average volume of water given to animals per day is therefore 16 litres per household.

Not all the households in Phameni and Makoko own domestic animals or livestock. Spokespersons indicated that residents who work full-time usually do not keep cattle, goats or pigs because they do not have enough time to care for these animals. Residents with very small stands usually do not own such animals either, because they simply do not have the space to keep them.

During interviews with residents it was noticed that some residents have flower gardens on their stands and that these residents tend not to keep animals. When these residents were asked why they had no animals, the usual answer was that they did not have time to care for animals. For residents who work full-time, flower gardens are an alternative to an empty stand with no animals. The residents who have flower gardens are also among the fortunate few whose private connections yield more water than those of the general population in the two research settlements (see Section 3.2.2.1). It would therefore seem that ample water supply does contribute to the practice of gardening.

3.4.2 Weekly domestic chores

According to spokespersons, household chores performed one to three times a week and that involve water utilisation include cleaning house, washing clothes, watering gardens and the cleaning of pit toilets.

3.4.2.1 Housecleaning

According to data gathered in the questionnaire, respondents in Makoko and Phameni clean their houses once or twice a week using between 10 and 20 litres of used-water per respondent's household for cleaning windows, floors, cupboards and other things. Research done in Inandi, KwaZulu-Natal, indicated that water used for house cleaning is often first used for other purposes, such as washing clothes, and was then ultimately used in the garden (Van Schalkwyk 1996:67). According to spokespersons in Makoko and Phameni, the practice of reusing water is common, and is favoured for water utilisation activities that do not require fresh water, such as house cleaning.

3.4.2.2 Washing clothes

Research done in Inandi, KwaZulu-Natal, indicated that laundry is done twice a week, with the most popular day being Saturday (Van Schalkwyk 1996:67). Questionnaire respondents in Makoko and Phameni indicated that they wash their clothes once a week and usually on a Friday. All washing is done by hand with commercial washing powders, such as Surf.

Patterns of domestic chores are formed around different factors within each individual settlement, such as distances to water points and the frequency of water supply. Thus, residents of individual settlements develop unique trends in practising domestic chores.

Within Makoko and Phameni, spokespersons said some women prefer to do their washing at home while others prefer to take their loads to the nearest water point and wash it there. The preference for doing washing at the water source, which can be a hand pump, the nearby Nsikazi River or even the fountain, is due to the effort involved in fetching large volumes of water for washing clothes (see Figure A8).

Women who do their washing at the water point reported they cannot indicate how much water they use because it is not measured but used straight from the hand pump or tap.

Women who do their washing at home reported using, on average, 125 litres of water per wash load, although some reported using as little as 40 litres or as much as 250 litres per wash load. Surveys undertaken in the Thabamooopo district of Lebowa (Van Schalkwyk 1996:68) revealed that residents use about 120 litres per household per week for washing clothes, which is similar to the volume used in Makoko and Phameni.

A volume of 125 litres per household per week for washing clothes amounts to 17.8 litres per household per day. The residents of Makoko and Phameni therefore use 2.38 litres per person per day for washing clothes.

The washing of clothes is a chore that is seen to serve an additional social function. Because washing is done in Makoko and Phameni by all on a Friday, women tend to form groups at the water points and engage in this communal task while chatting and laughing. Consequently, washing clothes at a water point becomes a social gathering and thus an enjoyable chore.

3.4.2.3 Watering fruit gardens

Residents of Makoko and Phameni have between two and twenty fruit trees on their stands. Mango, banana, paw-paw, avocado and peach trees are the most common. According to spokespersons, before the fruit trees are watered, the resident sweeps away all dry leaves underneath it and digs a shallow furrow around each tree trunk. This is done to ensure that no water is wasted. The fruit trees are watered one to three times a week with about 20 litres per tree.

Residents tend to water their fruit trees with used water. Water used for dishwashing or bathing is usually reused in the garden. According to spokespersons, residents reuse water for two reasons. Firstly, they believe in the concept of saving water and, secondly, the reuse of water saves some effort in fetching water.

According to spokespersons, the dissolved soap present in used water does not have a negative effect on the quality of the fruit produced by fruit trees. Spokespersons motivated their conviction by stating that fruit trees receive the bulk of their water supply

from undergroundwater through their roots. Therefore the volume of reused water used for watering fruit trees is not so high that the soap can affect the fruit. Spokespersons furthermore believed that soap actually protects fruit trees from disease as well as from ants that attack the fruit and the tree.

3.4.2.4 Sanitation water

Although every household in Makoko and Phameni has a pit latrine on the stand, not all residents clean theirs in the same manner. Most spokespersons reported that they pour the water that was used for washing clothes into the toilet every Friday. Others report pouring bath water into the pit latrine every other day. Some add chemical toilet cleaners to this bath and dishwashing water, or to fresh water, before pouring it into the latrine. Others reported using ash from wood fires, which they put in the toilet to neutralise odours. Van Schalkwyk's report (1996:69) states that no water for sanitation is required with the use of pit latrines. Theoretically, no water is required for the use of a pit latrine, but, in practice, the residents of Makoko and Phameni pour water into the pit latrine to keep it clean and free from odours.

On the basis of the estimated figures mentioned in Section 3.1, the following table can be drawn and an average volume of water used per household per day and per person per day within the two research settlements can be determined. It must be borne in mind that the results show only a rough estimate that is subject to variation. The average household population in Makoko and Phameni is estimated at 7.5 persons, as derived from the data in the questionnaire. Therefore, the average volume of water used per household per day is divided by 7.5 to determine the average volume of water used per person per day.



Table 3.1 Average volume of water used per household per day and per person per day in Makoko and Phameni (Nsikazi district, Mpumalanga)

CHORE	VOLUME WATER PER HOUSEHOLD PER DAY	VOLUME WATER PER PERSON PER DAY
DRINKING	11.25 litres	1.5 litres
COOKING	10 litres	1.3 litres
BATHING	187.5 litres	25 litres
HOUSECLEANING	USED WATER	USED WATER
DISHWASHING	7.5 litres	1 litre
WASHING CLOTHES	17.85 litres	2.38 litres
WATERING GARDEN	USED WATER	USED WATER
PIT TOILET	USED WATER	USED WATER
WATER FOR ANIMALS	16 litres	2.13 litres
TOTAL	250.1 litres	33.3 litres

The estimated volume of water of 33.3 litres per person per day used by the residents of Makoko and Phameni is higher than Van Schalkwyk's (1996) indication of 25 litres per capita per day estimated for settlements with a "very low level of living".

3.4.3 Water utilisation during brickmaking

Residents of Makoko and Phameni make bricks as needed for building, for example, when a house needs to be enlarged to accommodate a growing family. According to spokespersons, bricks are made with a mixture of sand, water and cement which is poured into moulds and turned out immediately. The wet bricks are then left in the sun to dry until ready for use. The sand used for brickmaking is found on the outskirts of the settlement. Residents pay R150 to have one truckload of sand delivered to their stand. The sand is used sporadically over a period of time as bricks are made.

The volumes of water used to make bricks differ. Some respondents to the questionnaire reported using 100 litres per bag of cement poured into the mixture, while others reported using 150 litres per bag of cement.

Overall, residents use large volumes of water for brickmaking. According to some residents, as much as 500 litres per day is used. However, brickmaking is not a daily or weekly chore. During the time that a house is under construction, the household's daily water usage will consequently be much higher than during normal times.

3.4.4 Water utilisation in vegetable gardens

Residents of Makoko and Phameni practise subsistence horticulture. The majority of the residents own cattle, pigs, goats and chickens, which they keep for their own use. Residents also cultivate crops such as maize (*immbila*), ground nuts or "jugo beans" (*tindlubu*), cassava and sugar cane (*umhoba*). These crops are cultivated in the fields (*masimini*) outside the settlements. These crops only receive water during the rainy season and are not otherwise watered, because spokespersons say it is unnecessary. Some residents also cultivate maize and sugar cane on their individual stands.

The women of the settlement cultivate ground nuts in the fields (*masimini*). Groups of women go together to the field where they each gather their own amount of ground nuts. Each woman then takes her batch of ground nuts home where she cleans them and sorts the nuts into piles of different quality. The nuts are laid out to dry in the sun, either in the yard or on big slabs of rock outside the settlement. According to spokespersons, the residents themselves eat the nuts of lesser quality, while those of better quality are sold. Maize and sugar cane are mainly cultivated for own use, although small quantities are sold.

In Makoko, residents also cultivate small patches of land in Makoko's communal vegetable garden. The Sukumane Women's Club is the founder of a two-hectare communal vegetable garden in the centre of Makoko. Each of the 46 members of the Sukumane Women's Club has an individual patch to grow cabbage (*liklabishi*), onions (*anyanisi*), tomatoes (*tamatisi*) and lettuce (*lilethisi*) (see Figure 9). According to spokespersons, most of the vegetables are grown for own use, but some are sold at the monthly market in Kabokweni.

Members of the Sukumane Women's Club pay an annual R12 membership fee. These funds are used to send members of the club to the Mzinti training centre where they are trained in vegetable cultivation skills. The fees also allow all members to attend the Department of Agriculture's annual Farmer's Day at Kanyamazane.

According to spokespersons, the Sukumane Women's Club received an electric water pump, commonly referred to as a "generator", to pump water from a borehole from the former KaNgwane Government's Department of Agriculture in 1988, to facilitate irrigation within the communal vegetable garden. The "generator" was installed at an unused borehole on the primary school grounds opposite the communal garden. The principal of the primary school was not prepared to use the schools' funds to pay for the electricity used by the "generator". Since a diesel machine can also turn the "generator", the principal suggested that the members of the Sukumane Women's Club buy their own diesel and use the "generator" after school hours. The members did not consider this to be a good idea, because, according to them, non-members would also use the water produced by the "generator" without paying for the diesel. Consequently, the "generator" is not being used and is stored at one of the member's houses.

Spokespersons say that the only time that the "generator" was regularly used was in 1994, when there was very little rain. Consequently, irrigation within the communal vegetable garden is currently done by hand. Women fetch water at the diesel water pump about 300 metres down the street from the garden, and water their vegetables manually.

The cultivation of crops such as maize and ground nuts is more extensive in Makoko and Phameni than the cultivation of vegetables such as pumpkin, tomatoes and onions. This is so only because the cultivation of maize, sugar cane and nuts is not affected as much by the poor water supply from the water reticulation network as the cultivation of vegetables, which need to be watered daily.

3.4.5 Water utilisation for religious practices

The Swazi of Makoko and Phameni do not only have a biological and domestic need for water but a religious need as well. *Tinyanga* (traditional healers) and church ministers from the research settlements utilise water in unique ways.

The Twananini Apostolic Church of Makoko has 35 members and has services every week on Tuesdays, Fridays, Saturdays and Sundays. According to the minister, the church needs water for cleaning and drinking as well as for “holy water” used during religious rituals. Water for cleaning and drinking is fetched by the minister from the nearby diesel water pump, but water needed for the rituals is always fetched from the Nsikazi river, which flows approximately one kilometre from Makoko. The minister uses only natural flowing water for religious purposes, because he believes it is filled with healing powers. According to the minister, water from a tap or borehole does not have such healing qualities. The river water is boiled before it is used (drunk), because the minister believes it is unclean.

According to the minister, the notion that water has healing powers is derived from the Bible which says that Jesus healed people in rivers. He believes the power of Jesus is in the river water. River water can therefore be used for healing after the minister purifies the water through prayer because, as a minister, he believes that the power of Jesus is also in him. According to the minister, if a sick person drinks this “holy water”, this person will be healed within a few days. This holy water is used to cure anything from headaches and chest-coughs to strokes.

The local *tinyanga* in Makoko use water in a unique manner for *inyanga*-students and local patients. The *inyanga* in Makoko trains between ten and twenty *tinyanga* students every year (see Figure A10). In the final stage of training, the students are immersed in a small swimming pool filled with about 400 litres of water, in which a bottle of special medicine is “hidden” which they have to “find” before being declared an *inyanga*. The details of this process were not researched because it is not part of the study. According to the *inyanga*, he does not have a particular preference for natural flowing water and

uses tap water. In the past, this final stage of the student's training was done in a river, but due to crocodile and hippopotamus attacks, a swimming pool is considered safer.

The *tinyanga* boil a medicine called "*imbita*" for their patients. This medicine is added to the water of the same swimming pool that is used for the initiation of *tinyanga* students. The patient is then immersed in the treated water to wash his/her body. The "*imbita*" is believed to give one power if one wants to "achieve something great". This water is also believed to help women fall pregnant and to cure the disabled.

According to one *inyanga*, the shortage of easily accessible running water in Makoko impedes his business to such an extent that he cannot treat as many patients as he would like to, and thereby loses income.

3.5 SUMMARY

The water supply systems in Makoko and Phameni which were installed by the government include the Northern Nsikazi Bulk Water Scheme and boreholes.

Bulk water supply in the Northern Nsikazi Bulk Water Scheme entails bulk water pipes connecting the Sabi River to the settlements served by the Northern Nsikazi Bulk Water Scheme, but with no reticulation pipe networks to serve individual stands within these settlements.

Makoko and Phameni are each supplied by DWAF with 10 000-litre plastic tanks, which serve as temporary reservoirs. These temporary reservoirs are linked to the permanent reservoir at Numbi. Each settlement's water reticulation pipeline is connected to the temporary reservoir located just outside each settlement. The residents of the settlement are supplied with water by means of the water reticulation pipes via communal water taps located on street corners within the settlement.

The temporary reservoirs' storage capacity of 10 000 litres is not enough to provide the population of Makoko with the RDP minimum quantity of 25 litres per person per day. With a population of 5 600, the volume of water needed per day in Makoko is 140 000

litres. The water enters the temporary reservoir of Makoko at an average flow rate of 1.62 litres per second. The peak flow rate of water in Makoko is 10 litres per second. This means that when the residents start to use water in the early morning (peak time) they use the 10 000 litres of water in the temporary reservoir within 16.6 minutes. During the rest of the day, the water flows into the reservoir and subsequently into the reticulation pipes of Makoko at an average flow rate of 1.62 litres per second. Therefore, no water is stored in the temporary reservoir after it has initially been emptied each morning. The result of this is that no water is stored in the temporary reservoir to accommodate the upcoming peak water use times during the rest of each day. The reservoir can only fill up during the night when people are not using water.

The installation of private connections to stands aggravates the existing water shortage.

The concept “private connection” refers to a water connection from the bulk water supply line to a private stand, and for which the owner does not have a legitimate permit from the relevant authority. A private connection is also a connection that has been installed by the resident himself or by a person employed by the resident, a person who is not a DWAF official and without DWAF’s supervision. This means that the water connection on the resident’s private stand is made without DWAF’s knowledge or approval.

Data gathered by the questionnaire show that although some respondents did make some sort of application for a water connection to their stands, whether to the relevant authority or not, 71.5% of respondents still made the connections themselves. Furthermore, respondents made the water connection without the help or supervision of the relevant government departments. Thus, almost all stand water connections in the two research settlements must be classified as “private connections” as they were installed in an unprofessional, non-approved manner.

The residents of Makoko and Phameni install their private connections either to the bulk water supply line to the settlement or alternatively to the water reticulation line within the settlement. The residents with private connections linked to the bulk water supply line have access to the settlement’s daily quota of water before the water reaches the reservoir.

The rest of the residents of Makoko start each day with the 10 000 litres of water in the temporary reservoir and receive their supply minus the volume used by the residents with private connections linked to the bulk water supply line. Private connections linked to the internal water reticulation pipes of the settlement are not installed by professional plumbers, but by the residents themselves and therefore cause severe leakage.

The private connections that are connected to the bulk water supply line of the settlement yield water on a daily basis. Private connections that are topographically lower down in the settlement than others also yield water on a daily basis because the weak downflow of the water is sufficient.

Residents with private connections can, however, not tell when or if they can expect water from their private connections from day to day.

The poor water supply of Makoko and Phameni's water reticulation systems is consequently the result of the following:

- The water storage capacity of 10 000 litres of each settlement's temporary reservoir is inadequate to provide residents with the RDP minimum quantity of 25 litres per person per day.
- The existence of private connections made to the settlement's bulk water supply lines reduces the rate of water flowing into the temporary reservoir.
- The existence of poorly constructed private connections to the reticulation pipes of the settlement result in pipe leakage, which cause the loss of innumerable litres of water per day.

The residents of Makoko and Phameni also have access to groundwater by means of boreholes installed by the former KaNgwane government. About 60% of the residents of Makoko and Phameni use boreholes on a daily basis. The boreholes are linked to hand pumps or diesel pumps. Diesel pumps are operated by assigned "pump operators" who are also residents in the settlements. The pump operators start the diesel pumps at 7:30 every morning. The water tank connected to each diesel pump must be kept full by the

pump operator during each day. The operators switch the pumps off at 4:30 pm every afternoon.

The hand pumps in Makoko and Phameni are Mono pumps with a rotary hand pump. Such hand pumps need less manual effort to produce water than, for example, piston pumps.

The task of fetching water at the boreholes is traditionally that of the females of the households in Makoko and Phameni. Water is fetched in 20 and 25 litre water containers and taken home in a wheelbarrow or on people's heads. Residents usually make two to three trips to the borehole per day. During one trip, residents usually fill about three water containers.

The most popular times of the day to fetch water in Makoko and Phameni are between 6 am and 7 am, between 2 pm and 3 pm (usually schoolchildren see Section 3.2.3.3) and between 4 pm and 5 pm. During these times to fetch water, there is usually a queue at the water point. Residents can wait up to two hours in such a queue, especially when they go to fetch water at 6 am, as all the residents of the settlement need water for cooking and washing before they can start the day.

Apart from the water supply systems installed by the government, the residents of Makoko and Phameni also utilise other water points. Natural water points include a fountain, such as the one located in Makoko C. Residents of Makoko and Phameni also make use of rainwater. Residents collect rainwater by placing basins under the edges of corrugated iron roofs. Rainwater is always used within three days because, after this period, the water contains larvae.

The detail of water utilisation in Makoko and Phameni was summarised in Table 3.1.

The estimated volume of water of 33.3 litres required per person per day used by the residents of Makoko and Phameni is higher than Van Schalkwyk's (1996) indication of 25 litres per capita per day estimated for settlements with a "very low level of living".

Apart from the water used by the residents during daily and weekly household chores, water is also used for brickmaking. Residents of Makoko and Phameni make their own bricks with a mixture of water, sand and cement. When they are building (and thus making bricks) residents use large volumes of water, up to 500 litres per household per day. However, a household only makes bricks during the initial building and subsequent enlarging of a house as the family grows. Therefore brickmaking seldom occurs and the large volumes of water used on these odd occasions do not significantly influence the estimated volume of water used per household per day.

In Makoko, residents also cultivate small patches of land in a communal vegetable garden. Irrigation within the communal vegetable garden is currently done by hand. Women fetch water at the diesel water pump about 300 metres down the road from the garden and water their vegetables manually. Apart from the vegetables, residents also cultivate crops such as maize, sugar cane and ground nuts. These only receive rainwater during the rainy season and are not otherwise watered. The cultivation of maize, sugar cane and nuts is more extensive than the cultivation of vegetables such as tomatoes and onions.

Water is furthermore used in unique ways by church ministers and *tinyanga* in Makoko and Phameni. In these instances, water serves a religious purpose quite apart from biological and domestic purposes. Church ministers use “holy water” to heal church members and *tinyanga* boil special medicines, such as *imbita*, in water in which patients bathe for healing purposes.

CHAPTER FOUR

QUALITY OF WATER SUPPLY AS AN INDICATOR OF QUALITY OF LIFE

4.1 INTRODUCTION

The pattern of the water utilisation practices (see Section 3.4) among the residents of Makoko is determined directly by the current water provision situation within the research settlements. It is especially the women's daily routines that are influenced by the pattern of water supply and availability. Chapter Four deals with the issue of how the available water facilities and infrastructure (water provision) and consequently the water utilisation practices, ultimately influence the quality of the lives of the residents of Makoko (see Section 1.3), according to their own perceptions.

The concept "quality of life" must be clearly defined in terms of the people of Makoko's unique culture and environment. In order to set criteria for "quality of life" the residents' perception of "quality of life" needs to be determined. The actual water provision situation in the settlement is compared to the criteria for sufficient water provision as determined by the South African government. Consequently, meaningful and sensible conclusions can be reached on how the standard of water facilities within Makoko ultimately influence the residents' quality of life.

4.2 DEFINING QUALITY OF LIFE

According to Smedley (1979b:1), the concept "quality of life" cannot be defined in universal terms: "the concept 'quality of life' raises a number of important issues, *inter alia*, the need to take cognizance of subjective (as well as objective) realities and the need for research into, and action based on, the priorities of particular communities rather than on our assessments of what the constituents of high quality of life should be."

According to a UNESCO report of 1977, quality of life is “an inclusive concept which covers all aspects of vital needs as well as more transcendental aspects of life such as personal development, self-realisation and a healthy eco-system” (Dube 1988:58). An individual’s “subjected reality, his[/her] subcultural realities and the objective reality of the society in which he[/she] lives in dialectical relationship with each other” therefore mould an individual’s concept of quality of life (Smedley 1979b:7).

The objective reality of the society in which a given individual lives is structured by factors such as the historical background of the society’s members as a group, the social institutions, the economy as well as the authority structure of the society and environmental factors (Smedley 1979b:7). From an anthropological perspective, culturally-determined value judgements have to be included in the “list” of determining factors in order to arrive at an acceptable description of the meaning of quality of life.

From the work of Smedley (1979a and 1979b), Jonas (1983), Barlett and Brown (1992), Romney, Brown and Fry (1994), and Dube (1988), it can be concluded that a general definition for the term “quality of life” does not exist. However, four important aspects or characteristics of the concept emerge from Smedley (1979b: 6), namely:

- The concept “quality of life” is complex and the assessment thereof is a complicated task clouded by cultural relativism.
- The perception and assessment of quality of life is subjective, although an individual may judge his/her own quality of life according to his/her culture’s (and/or subculture’s) commonly held beliefs about the constituents of high or low quality of life.
- Perceptions and evaluations of the constituents of high or low quality of life are relative because conditions which may be regarded as decreasing quality of life by one individual or member of a culture need not be evaluated in the same way by another individual of the same cultural group.

- Quality of life may be a concept that has not been consciously comprehended by members of a cultural group and there may be no awareness of alternatives to established patterns of life.

It is clear that the concept of quality of life can easily be used without adequate understanding of the context and relativism inherent in the concept.

Romney *et al.* (1994:246) state that there are several reasons for the difficulty experienced in clearly specifying the term “quality of life”. One reason for this is that the concept is value-laden. Romney *et al.* (1994:246) further point out that “processes and outcomes which are designated as ‘superior’ QOL [quality of life] are typically those accepted and valued by contemporary society, *often by the middle class of that society*” (italics in original). Contemporary society, however, in the above context, is defined in terms of a Western orientation.

According to Coertze (1980:44), a system of value judgements in a given cultural group is established through the group’s co-existence over generations. The system of value judgements is conveyed to following generations through the process of enculturation (Coertze 1980:45):

Ten gevolge van die saambestaan van mense, en vanweë hulle noodsaaklike medewerking en onderlinge verantwoordelikheid in die lewensproses, ontstaan daar by lede van ’n etnos ’n konsensus in die oordeel en opvattinge oor die waarde van verskynsels, van handeling en van gedraging in hulle daaglikse lewe en saambestaan. ... Soos elke ander kultuuraspek ontstaan ’n waardesisteem ook deur samewoning, samewerking, samelyding en samestryding; dit kom so langamerhand as ’n geïkete sisteem tot stand.⁴

⁴ Because people co-exist, and because, of necessity, they co-operate and are jointly responsible in the life process, consensus arises among the members of an ethnos in terms of people’s judgement and understanding of the value of phenomena, actions and behaviours in the daily life and co-existence of the ethnos... As with any other aspect of culture, a system of values emerges when people live together, work together, suffer together, struggle together; it emerges gradually as an established system.

A system of value judgements is therefore specific to each different culture. Value judgements of people from a specific culture on the different aspects of their conscious world are, according to Kriel (1992:14), formulated against the backdrop of a communal world view:

...’n sisteem van sinvormende geheeloordele wat ontplooi uit filetiese kennis, opgedane en oorgedraagde kennis, en deelnemende en emosionele betrokkenheid by die ervarings en aktiwiteite van die groepsverband waarin die individu gebore word en grootword. ...en daarom die draers van ’n bepaalde kultuur se denke, handeling en spontane reaksie op bepaalde prikkels, tot ’n sinmakende geheel [saamsnoer].⁵

At the end of any discussion on the concept, “quality of life”, one must agree with Smedley (1979a), when she states that it is simple intuitively to understand what quality of life means, but that it is virtually impossible to give a theoretical description of the quantitative meaning of the concept (Smedley 1979a:204). In broad terms, however, quality of life refers to the satisfactory nature of people’s lives, according to their own perceptions (Jonas 1983:96).

4.3 MEASURING QUALITY OF LIFE

According to Barlett and Brown (1992:154), quality of life involves both an objective measurable reality and a subjective unquantifiable reality. Objective material measures or social indicators (such as per capita income, mortality rates or, for the purposes of this study, water supply) attempt to objectively measure people’s life conditions in terms of wealth and health. The subjective approach attempts to measure quality of life in terms of individuals’ assessment of their own life circumstances and life satisfaction, thus emphasising the role of individual perception (Barlett and Brown 1992:154).

⁵ A system of holistic judgements that make sense of and emerge from philetic memory, experience and transmitted knowledge, and empathetic and emotional involvement in the experiences and activities in the group context into which the individual is born and in which he/she grows up. ...and for this reason [joins] the bearers of a particular culture’s thinking, actions and spontaneous reaction to certain stimuli to form a whole which makes sense.

These two approaches, measurable reality and a subjective unquantifiable reality, include a person's ability to achieve culturally prescribed goals. Therefore, quality of life might be regarded as the relationship between objective social indicators and culturally defined perceptions of needs and life expectations. Given the strong role that the individual plays in forming perceptions of needs and life expectations, brought about through the filter of his or her culture, one agrees with Jacobs and Pauw (1995:99) that these perceptions are directly linked to the given culture's system of value judgements.

Jonas (1983:97) states that an anthropological approach to measuring quality of life stresses the link between culture and quality of life. People's satisfaction with their lives is *therefore determined by the extent to which their culture fulfils their needs and expectations*. This means that a complete view of a group of people's quality of life can only be formed by acknowledging the entire spectrum of such a group's culture, including the fact that the culture might change due to a number of factors. Therefore, evaluation of quality of life entails the use of values. According to Headey (1981:157), one aim of quality of life research is to determine which values different sections of a society want to fulfil in specific facets of their lives. Consequently, it is necessary to include the value judgements of the residents of the research settlements regarding water as a natural resource, and the water supply as a service when determining how water supply influences the quality of the lives of the residents of, for instance, Makoko.

As is shown in the above paragraphs, the task of measuring quality of life entails an objective and a subjective approach. The goal of this chapter is to determine how water supply as an objective reality (social indicator) influences the residents of Makoko's quality of life, which in turn is a subjective reality. In order to achieve this goal, criteria for both the objective and subjective realities had to be set.

For the purposes of establishing criteria for water supply (objective reality), the RDP minimum standard in terms of basic water supply was used (see Section 2.9.6) as a point of departure. In establishing criteria for the quality of life of the residents of Makoko (subjective reality), it speaks for itself that only the residents of Makoko can define their

own quality of life. Criteria set by Möller (1992:50) for measuring quality of life are used as a guideline for measuring the residents' quality of life. Möller (1992:50) gives four criteria which she says “share a common dimension and can usefully be condensed into a composite index of overall Quality of Life” (Möller 1992:49), namely:

- satisfaction with life as a whole;
- global happiness;
- life rewarding; and
- life getting better.

4.4 CRITERIA FOR THE QUALITY OF WATER SUPPLY AND FOR MEASURING QUALITY OF LIFE

4.4.1 Quality of water supply (objective reality)

The RDP minimum standard in terms of basic water supply is used as a set of criteria since it represents the minimum standard of water supply for all South Africans (White Paper on Water Supply and Sanitation 1994:15). In order to determine the quality of the water supply via the water reticulation pipelines of Makoko, the current status of Makoko's water supply is compared to the RDP minimum standard criteria, as set out in Chapters Two and Three.



Table 4.1 RDP minimum standards for water supply compared to the Makoko settlement's water supply (Nsikazi District, Mpumalanga)

RDP CRITERIA	RDP MINIMUM	MAKOKO
Quantity required	25 litres per capita per day	33 litres per capita per day (see Table 3.1)) ⁶
Cartage	Less than 200 m	0 – 1 km (see Section 3.2.3.3)
Availability	10 litres per minute from outlet	Erratic availability from outlet (see Section 3.2.2.1)
Assurance of supply	Raw water 98% of the time. Minimum of 1 week interruption per year	Only 12.7% of the households have water 98% of the time from their stand taps (see Section 3.2.2.1)
Quality	Minimum standard re health-related chemicals, microbial contaminants and potability	Very good quality (see below)
Upgrading	Desire of community to upgrade basic water service to provide for household connections	Water pipe network is designed to accommodate upgrading (see Section 2.8.2)

Qualitative data indicate that the respondents of Makoko have two distinctly different perceptions regarding the cleanliness of the water pumped from the Sabi River. One perception is that the water is cleaner than any other water source because it is treated with cleaning agents such as chlorine, while the other water sources are not. Spokespersons often referred to these cleaning agents as “JIK” or “medicine”.

⁶ The RDP criteria are projected against the facts and figures of water supply by means of the water reticulation system. The RDP criterion of quantity is projected against the volume of water that respondents receive mainly through boreholes. The reason for this is that 60% of residents make use of boreholes for their daily water supply (see Section 3.2.3) due to the untrustworthy nature of the water reticulation system (see Section 3.2.2). Therefore, when indicating the volume of water residents have at their disposal daily, it is of necessity representative of the volume of water received from boreholes.

The other perception is that water cannot be accepted to be clean “if one does not know where it comes from”. Spokespersons from Makoko and Phameni generally reported that they considered borehole water to be clean because it is underground where nothing can contaminate it and sand has a filtering effect on the water. Water from the Sabi River was perceived by some spokespersons to “come from far away and no one knows what might have contaminated it along its course to the settlement”. These respondents mentioned that corpses of humans and animals might be in the river and the water might therefore be contaminated. However, these fears were not common.

A company specialising in water technology, namely SMS Afriwater, monitors the quality of the Sabi River water which supplies the northern Nsikazi District. Tests done by SMS Afriwater to monitor the quality of raw and chlorinated water pumped from the Sabi River to the northern Nsikazi produced the following results (Van Oudtshoorn, 1999: pers. com.)⁷:

- The low count of total dissolved solids (48 - 62 mg/l) indicates a low amount of pollution in the water.
- The pH-level of between 7.30 and 8.10 indicates very little contamination through air-pollution and agricultural material.
- The very low level of sodium (2.6 – 6.7 mg/l) indicates a low health risk (a count above 50 mg/l can cause heart problems).
- The low to very low nitrate count (10.3 – 0.07 mg/l) indicates very little pollution through human excreta.
- The very low fluoride content (<0.01- 0.14 mg/l) in itself does not cause dental problems, but adding a fluoride supplement to the water could help to reduce dental problems.

⁷ Mr J. VanOudtshoorn is a water technologist and works for SMS Afriwater in Nelspruit, Mpumalanga. SMS Afriwater is a private company, contracted by DWAF to monitor the quality of the water pumped from the Sabi River.



- The total temper of calcium and manganese is soft to very soft (86 - 22 mg/l) which makes the water corrosive and can cause weak teeth and bones. However, including fresh milk in growing children's diets can prevent corrosive water from weakening teeth and bones.

The above information indicates that the water received by residents of Makoko through the water pipe system is of good quality and cannot cause health-related problems. Tests are underway to determine the quality of the borehole water, which is currently used in bigger volumes by the residents of the settlement than the water pumped from the Sabi River (Van Oudtshoorn 1999:pers. com.).

The water provision in Makoko through the water pipe network does not compare well with the RDP minimum standard. Only three of the RDP criteria for basic water supply are met, namely, quantity, quality and upgrading. The remaining three criteria, cartage, availability and assurance of supply, are not met. The reasons for the system's inability to meet the latter three criteria are all rooted in the existence of private connections within Makoko and the fact that the reservoir of the settlement has inadequate storage capacity (see Sections 3.2.1, 3.2.2.1):

- With regard to cartage, the RDP minimum standard states that the nearest water point must be within 200 metres of a resident's stand. According to an engineer working directly with water provision at the Northern Nsikazi Bulk Water Scheme, communal taps that form part of the water reticulation pipeline are strategically located within each settlement in the scheme to adhere to the 200 metre standard. However, due to the effect of private connections and the size of the reservoir on the yield of the water reticulation system (see Sections 3.2.1, 3.2.2.1), the communal water taps in Makoko do not yield sufficient water to serve as a permanent water source. Therefore, residents of Makoko are forced to rely on other water sources on a daily basis. As the data from the questionnaire showed, 60% of questionnaire respondents make use of boreholes (see Section 3.2.3) to compensate for the poor water supply of communal taps as well as their own private connections. Residents have no alternative but to walk up to one kilometre to the boreholes in Makoko and wait in the queues.

- The criterion of availability is not met because the water from the reticulation network is very erratic and does not adhere to the RDP standard of 10 litres per minute from outlet. As was mentioned in Section 3.2.1, the water availability from the recently installed taps in Makoko should be 15 litres per minute, but these taps currently yield no or very little water.
- The RDP standard of assurance of supply dictates a supply of raw water 98% of the time, with no more than one week's interruption per year. The data from the questionnaire showed that only 12.7% of respondents have access to a permanent water supply (98% of the time) from the water reticulation system (see Section 3.2.2.1). These residents are either the lucky few whose stands are geographically lower down in the settlement and therefore the weak downflow of water in the water pipes is sufficient to allow their private connections to yield water all the time or those whose private connections are linked to the bulk water supply line.

The above indicates the objective reality of how Makoko's water supply compares with the RDP water supply standard. Next, the subjective experience of this situation is examined.

4.4.2 Quality of life (subjective reality)

The purpose of this section of the study is to determine whether the settlements' water supply has an influence on the residents' perception of their quality of life. The section also examines which aspects of the residents' daily life cause them to experience quality of life, and to what extent.

During the two years of research amongst the residents of Makoko and Phameni, an evaluation was made of the residents' value judgements and their perceptions of their quality of life as well as their perceptions of how their water supply affects their quality of life (see Section 1.5.2). Although these value judgements could easily be observed, they could not easily be tested. Consequently, these observed value judgements were tested against the opinions of eleven carefully chosen spokespersons (see Section 1.5.2)

from the research settlement by means of in-depth research, using the criteria set out by Möller (1992) (see Section 4.3).

In the literature, it is suggested that research on quality of life should be undertaken in such a manner as to avoid “flamboyant and insincere” answers (Mukherjee 1983:52). Such answers can be avoided by adopting a style of interview which “elicit[s] a complete answer from the interviewee in response to a question” (Mukherjee 1983:52). The interview must produce answers that would be answered “neither in terms of set replies of ‘yes’, ‘no’ and ‘don’t know’, nor in the telegraphic language of one or two words” (Mukherjee 1983:52).

It was therefore decided that qualitative research in the form of interviews would be a more efficient method than quantitative research for testing perceptions on quality of life. A qualitative research methodology creates scope for discussions that eventually reveal a respondent’s sincere opinion.

In order to test the residents’ value judgements on aspects of their everyday lives that have an influence on their quality of life, the criteria set out by Möller (1992:50) were used as a guideline for measurement (see Section 4.3).

Since the goal of this study is to determine specific aspects of life that cause the residents’ global (un)happiness, these four criteria were modified into questions which set out to confirm these four aspects in terms of their being linked to the water supply situation in Makoko. Evaluations of the residents’ perceptions that were gained during the two years of research were “translated” into questions. These questions were put to a group of eleven residents from Makoko who were selected to be as diverse as possible to avoid one-sided answers (see Section 1.5.2). The eleven interviewees thus allowed a check to confirm the information on perceptions of quality of life which the researcher had obtained over the two years of research. According to Coertze (1993:69-78), qualitative research adds depth to answers when the same question is repeated in different ways, something which cannot be easily done in quantitative research using questionnaires.



4.4.2.1 The quality of life interviews

The questions created to confirm perceptions on quality of life (the check interview) were the following:

- Describe the present state of living conditions in Makoko. Refer to positive and negative aspects.
- Are you in general a happy person? What in your daily life causes you to be happy/unhappy?
- Name the six most important things in your life.
- Are these important things as good as they can be? If not, why and how can they be improved?

a. Positive and negative aspects about life in Makoko

i. Positive aspects

The selected check interviewees confirmed the general value judgement of the residents of Makoko encountered over the two years of research that there is very little crime in Makoko. According to spokespersons, this is because Makoko is a small rural settlement and the inhabitants are not exposed to the vices of the townships and locations. A reason given for the low crime rate is that most of Makoko's inhabitants have lived there since birth and that there are very few "strangers" who can upset the long-established routine of Makoko's residents.

Another positive aspect confirmed by the check interviewees, is that Makoko offers enough space for its inhabitants to practise subsistence horticulture. As with the low crime rate, interviewees compared the available space in Makoko and the available space in locations or townships. The latter are more crowded due to higher population figures. For example, the location of Kabokweni in the Nsikazi District has a population of 10 356, in comparison to Makoko's population of 5 600 (see Section 2.6).



A further positive aspect confirmed by the check interviewees is that Makoko offers education to children of all ages, as it has a crèche, a primary and a secondary school. Consequently, children do not have to travel to other settlements or locations to attend school. Spokespersons said that this had the effect that children attend school better in Makoko.

Further positive aspects confirmed by the check interviewees were the clinic in Makoko, the fact that residents have access to electricity and telephones, and that the traditional Swazi culture is still strong amongst the residents. The Swazi culture is strong because most residents have lived in Makoko since birth and there are thus few outside influences that can weaken the traditional Swazi culture.

ii. Negative aspects

The negative aspect most commonly confirmed by the check interviewees is Makoko's water shortage. According to the spokespersons, the main problem created by the water shortage is that less subsistence horticulture can be practised than they would like. Vegetable gardens are the livelihood of most of Makoko's residents, not only for personal consumption but also for commercial purposes. Apart from maize and ground nuts, which only need rainwater, vegetables such as tomatoes, cabbage, onions and spinach, as well as fruit such as mangoes, are sold locally and in Nelspruit for extra income. These plants need to be watered fairly regularly (see Section 3.4.4).

The negative aspect second most commonly confirmed by the check interviewees was the lack of transport in conjunction with the poor condition of roads to and in Makoko. The bus to Nelspruit leaves at 8 am and only returns after 4 pm. Furthermore, almost no taxis service Makoko, due to the bad roads. According to spokespersons, taxi owners refuse to use bad roads because their minibuses suffer tremendous damage. Roads to and in Makoko are not tarred and have many potholes. As was mentioned in Section 2.10, a project to tar the road between Makoko and Malekuthu is currently underway.



The third most common negative aspect confirmed by the check interviewees was the slow rate of infrastructure development in Makoko. Spokespersons complain that the government does not keep its promises to improve the condition of water facilities and roads or to build sports grounds for the school children. Furthermore, according to the spokespersons, the various government officials in charge of the infrastructural developments ensure that the settlements where these government officials themselves live are given priority in developments and far-off rural settlements such as Makoko are tended to last. This tendency among government officials is also reported by persons who speak on this matter from long experience (Els 1999: pers. com; Boonzaaier 1999:pers. com.).⁸

Further negative aspects of life in Makoko noted were the high rate of unemployment, the undisciplined youth, and witchcraft. The reason witchcraft is mentioned is that there were a few deaths within a short period of time in Makoko during the time of the interviews, and the spokespersons believed these deaths were due to witchcraft.

The positive and negative aspects confirmed by the interviewees about life in Makoko indicated what the residents considered important and what they perceived as problematic. Subsistence horticulture forms an integral and very important part of the spokespersons' lives, because it is part of their daily survival. The water shortage in Makoko therefore has a direct influence on the spokespersons' ability to cultivate their vegetable gardens and thus also on their ability to survive.

⁸ Prof. C.C. Boonzaaier and Prof. H. Els, both from the Department of Anthropology at the University of Pretoria, have done in-depth research projects which included focusing on the role that government officials play in rural development (Hartman *et al* 1993).



The confirmed positive and negative aspects of life in Makoko can be outlined as follows:

Positive aspects:

- a low crime rate;
- ample space for cultivating vegetable gardens;
- education for all ages;
- electricity and telephones;
- the Makoko clinic; and
- that Swazi culture is still practised.

Negative aspects:

- water shortages;
- the slow rate of infrastructure development;
- undisciplined youth;
- unemployment;
- witchcraft; and
- the poor condition of roads

b. Global happiness

The eleven check interviewees confirmed the general value judgement of the residents encountered during the two years of research in Makoko that the reason for happiness was due to residents' home environment and that unhappiness was due to extreme financial hardship.

The concept of financial hardship indicates a value judgement in the sense that the concept can mean different things to different people. Therefore, when spokespersons said that they were unhappy due to financial hardship, their statements had to be interpreted according to the spokespersons' own value judgements. These spokespersons were asked to explain how their financial hardship affects their lives. Their reply was



that financial hardship meant that they could not buy clothes and schoolbooks for their children or buy food for their animals. Financial hardship thus has a long-term effect on these spokespersons' lives, since, amongst other things, it affects their children's education.

It is apparent that financial hardship can cause an experience of reduced quality of life and may even overshadow the positive aspects that should provide good quality of life. One spokesperson expressed total despondency about her financial situation and added that her unhappiness was aggravated by the fact that nobody could help her.

A happy home environment is confirmed to be one of the primary aspects that determine quality of life of those people. It may even push other problems into the background because the "happy spokespersons" also mentioned financial hardship but not to the same extent as the "unhappy spokespersons".

c. The six most important things in life

The purpose of the question was to confirm what the residents perceived to be essential for happiness in life. Money, a job, an education, a family, religion and practising horticulture were confirmed to be essential by the check interviewees.

- The selected interviewees confirmed the general value judgement among the Makoko residents that education was important because "it ensures a job and therefore money". This statement represents a value judgement of the spokespersons with regard to what an education can offer. The younger spokespersons wanted a university or technicon education. The older spokespersons wanted education for their children so that these children could get good jobs and could help their parents financially.
- The selected interviewees confirmed that money is important because "without money one can do nothing". Spokespersons gave examples such as wanting to extend



their houses because of growing families and indicated that this could not be done without money. One answer given was that “without money one will steal”.

The selected interviewees confirmed the perception that money can be obtained if the government provides jobs. This statement represents the spokespersons’ value judgements on whose responsibility it is to ensure jobs. Some of the spokespersons suggested that the government should build an industry or factory close to Makoko that would provide all the residents with jobs. None of the spokespersons mentioned that money could be made from selling fruit and vegetables. According to the spokespersons, income derived from selling fruit and vegetables is only enough to sustain the existing lifestyle and will not improve it. When the spokespersons refer to “an education that will ensure a job and provide money” this comment can be interpreted as meaning a gateway to an exalted lifestyle with enough money.

- The check interviewees confirmed that a family is very important to ensure a happy life. Reasons given were: “children are a gift from God”; “my children will support me in my old age”; “one must have a family with which one can share one’s life”.
- The check interviewees confirmed religion to be one of the most important things in their lives because “God will always help you”. Respondents also motivated their perception of the importance of religion by saying that praying to God keeps one a good person.
- The check interviewees further confirmed that the cultivation of fruit and vegetable gardens is important in the residents' lives because it is the only means of feeding one’s family. For most residents it is the only source of income and as long as fruit and vegetables are cultivated, “you know your children will not die of hunger”.
- Other things that were confirmed as being important in the resident’s lives are water because “one cannot live without water”, and having a house “to accommodate one’s family”.

The interviews with the selected interviewees confirmed the evaluation that the following six aspects are vital to ensure quality of life to the residents of Makoko:



- money;
- a job;
- an education;
- a family;
- religion; and
- an opportunity to practise subsistence horticulture.

d. Improvement of the six most important things in life

- **Money.** The selected check interviewees confirmed the general perception that the people of Makoko do not have enough money. They motivated this belief by saying that the cost of living is too high and that, due to poor job opportunities, a resident of Makoko will never have enough money. Once again, the concepts “high cost of living” and “not enough money” were value-laden. According to spokespersons, “not having enough money” means one cannot buy essentials such as household soap, bath soap, clothes and building materials. When the check interviewees were asked how they themselves could improve their income despite the poor job opportunities, they suggested that residents could use labour from Makoko for odd jobs such as digging pit toilets, instead of getting people from “outside” to do it. According to them, this will then ensure that short-term job opportunities within Makoko are not lost to non-residents. Further suggestions included the idea that residents must use their spare time to buy and sell goods in order to add to their income. One interviewee mentioned that she had made and sold candles in the past and that she would do so again.
- **Job opportunities.** When the check interviewees were asked how the poor job opportunities could be improved, they confirmed the general value judgement encountered over the two years of research that it is the responsibility of the government to ensure that the people of Makoko have jobs. Only one of the interviewees in the check interviews mentioned that he could get a loan from the bank



with which he could start a small business. The remaining check interviewees maintained that the government must, for example, “build a factory near Makoko where all the residents can get jobs”. One respondent said that she was in the process of applying for a travel agent’s course and, when she had completed this course, the government would give her a job. It is thus apparent that the general value judgement regarding jobs is that it is the government’s responsibility to give people jobs. This in itself creates false expectations, but also attests to a lack of perspective regarding the realities of life outside Makoko.

- Education. According to the check interviewees, primary and secondary education in Makoko is satisfactory. This is also the value judgement that was encountered among residents during the two years of research. For example, the principal of the high school in Makoko ensures that all the teachers know their timetables so that no classes are missed. The principal also improves discipline by rewarding pupils who wear uniforms. Furthermore, the spokespersons in the check interview confirmed the general value judgement that it is vital to receive an education because it ensures a job and therefore money. This is a deep-rooted perception and expectation among residents of Makoko. However, these value judgements on education place a higher value on completing school than on actually gaining knowledge.
- Family. As mentioned in Section 4.4.2.1 c, a happy family life is essential for a good life. The check interviewees confirmed the general perception that children are “a blessing from God” and that “one cannot be happy without a family”. The older check interviewees also confirmed the general value judgement that their children would help them in their old age. Therefore, when one has a happy family life, unhappiness is caused by external factors, such as financial hardship.
- Religion. According to the check interviewees, the importance of religion is diminishing among the youth of Makoko. This confirms the value judgement encountered among the older spokespersons during the two years of research. Spokespersons complained that the young men tend to drink over weekends and



consequently do not attend church. One young interviewee stated, however, that he could not attend church because he worked as a field ranger in the Kruger National Park on Sundays. Other interviewees claimed that poor church attendance among the Makoko youth was due to the fact that Makoko does not have a church building. It is an open question whether having a church building will influence the youth to attend church.

- Horticulture. As mentioned in Section 4.4.2.1 a, the interviewees confirmed the value judgement of the spokespersons that the poor water supply of Makoko is the main reason why residents struggle to cultivate their vegetable gardens. For most residents, selling fruit and vegetables is their only source of income and an improved water supply will definitely, in their opinion, lead to more successful cultivation. However, the cultivation of maize does not require irrigation, since rainwater is sufficient for crops. A point worth noting here is that the spokespersons did not perceive increased effort on their part in irrigating their vegetable gardens as a means of improving their vegetable produce, which would in turn improve their income potential and therefore their quality of life. Constantly, the value judgement that emerged was that their ability to produce more vegetables is related more to external factors than to their own increased efforts.

Part of the check interview contained direct questions on how the spokespersons thought the poor water supply of Makoko influences their lives. The purpose was again to confirm the value judgements encountered during the research period.

e. Spare time created by an improved water supply system

The check interviewees confirmed the value judgement that residents would spend more time on their horticulture if the water supply was better. Reasons given for this answer is that if they spent more time on horticulture they would have more crops and vegetables to sell and to consume. Their lives would therefore improve in terms of their diet and their finances if it were not necessary to spend time fetching water each day. This means that, according to the spokespersons, poor water supply influences their horticulture negatively



and forces them to spend valuable time on fetching water from water points. This is a general value judgement encountered throughout Makoko during the research.

The check interviewees confirmed the general perception that schoolchildren would have more time to do their homework if they did not have to fetch water after school. As mentioned in Section 3.2.2.3, it is part of the daily routine for schoolchildren to fetch water after school. Consequently, there are long queues at the water points during this time of the day and it takes at least one or two hours out of the afternoon to fetch water which children could have spent on homework. The spokespersons therefore perceive the time their children spend on fetching water as impeding their children's education. Education, as pointed out in Section 4.4.2.1 d, means the attendance of school, is perceived to be vital to ensure a job, which in turn ensures money. One young spokesperson mentioned that if she did not have to spend time fetching water each day she would have more time to spend on her academic correspondence course. Whether this is true or not, it remains an important perception on the influence that a poor water supply system has on quality of life.

Check interviewees further confirmed the statement by residents in general that they would also like to rest if they had spare time in the day because they work hard in the fields. One spokesperson said he would like to have time to spend on soccer because if he improved his talent he might become a soccer star and then earn lots of money.

The value judgement that the people of Makoko would like more time to spend on horticulture and education and that they are impeded because of an unsatisfactory water supply system was confirmed. It was apparent that the spokespersons perceived improved horticulture and education as a means to earn more money and thus create a better quality of life.



f. Improvements in lifestyle due to improvement in water provision

Questions were put to the check interviewees to confirm the general perceptions encountered during research on how improved water provision would influence the important aspects of the residents' lives and consequently their quality of life.

All the check interviewees confirmed that their lifestyles would be much better if Makoko did not experience poor water provision. The interviewees confirmed that they would have successful vegetable gardens, which meant they would eat better and would have more vegetables to sell and consequently earn more money. They also confirmed that they would plant flower gardens to beautify their stands and that they would practise better hygiene because they would have more water to bath in, to wash their clothes, and to clean their houses.

It is therefore a confirmed value judgement that an ample water supply would ensure better horticulture, hygiene and even add the aesthetic pleasure of flower gardens.

g. Increased productivity due to improved water supply

Questions to the check interviewees about whether productivity would increase due to improved water supply were, in a sense, "stating the obvious". The answers had already been given in the preceding questions. However, these questions were asked as a means of falsification to confirm the general value judgements on whether an improved water situation would truly influence the residents' daily routine. It has already been established that, in the spokespersons' minds, their quality of life would be improved by the ability to practise more successful horticulture. The question is now whether the residents *would* practise more and better horticulture if they had more water. The same question can be asked about whether schoolchildren would spend more time on their homework if they did not have to fetch water after school. A realistic answer can obviously only be provided once research has been conducted in a settlement before and after the improvement of their water supply.



The check interviewees confirmed the general perception of the residents of Makoko that they would be more productive if they had no problems with water availability. They said that they would plant more vegetables than they currently do. The spokespersons also mentioned that, at present, due to the poor water supply, the cultivation of maize is more extensive than the cultivation of vegetables, because vegetables need more water. The check interviewees specifically mentioned that the communal vegetable garden of the Sukumane Women's Club would produce more vegetables than it currently does.

It is thus a confirmed value judgement that ample water supply would ensure better horticulture. The perceived results of better horticulture have been outlined above as being a means to earn more money by selling more vegetables and having more food per household on a daily basis.

4.4.2.2 The quality of life indicators of the residents of Makoko

The information set out in Section 4.4.2.1 above confirms that the residents of Makoko measure their own quality of life in terms of:

- their ability to practise horticulture insofar as it provides them with an income and food for their households;
- having an income, which ensures the ability to provide the household with a house, clothes, and funds to pay for education;
- receiving an education, which promises a job and therefore a higher income because of the job opportunities that the residents believe the government will create; and
- having a happy family life.

It is clear from these four aspects of the residents' lives that money or income is the primary indicator of perceived quality of life. This is a definite indication of acculturation towards a modernised life style. Residents of a rural settlement such as Makoko cannot survive on subsistence agriculture alone, because the income derived from it is insufficient to fund basic essentials such as soap and clothes. This is emphasised by spokespersons' statements, such as "without money one will steal" and



“without money one can do nothing”. However, survival is not necessarily the only reason why money is important in the lives of the residents.

Atte (1983:40) states that in the rural areas of Nigeria, people desire to bring their living standard up to the level of that of city dwellers. This entails buying goods such as radios, mattresses and non-traditional food items, which rural people regard as basic needs. Atte (1983:41) explains this phenomenon as being a result of educated sons and relatives in non-farming jobs in towns who send money home to their families in rural areas. Rural people often rely upon this financial contribution to survive. When family members who live in the cities return home to visit their family, they arrive in cars, have wrist watches and wear modern clothes. Rural people measure their living standard against that of their relatives from the city whom they perceive as “richer” and consequently perceive the city dwellers’ lifestyle as superior to their own.

Atte (1983:42) further states that this is the reason why the rural people of Nigeria regard education as vital if they are to improve the quality of their lives. Having an education represents the potential to break from the “old” to the “new” and the “new” is considered better than the “old”. The lifestyle of educated city people contrasts so sharply with that of rural people that rural people are convinced that to live in the city and being educated is better than their way of living.

The desire to live a modern (non-traditional) lifestyle is observed specifically among the young residents in Makoko. In casual discussions with teenagers and young men and women in their twenties living in Makoko, they expressed a strong interest in the modern world. Their knowledge of the modern world stems mainly from siblings and friends who work or live in the townships or cities and also from what they see on television. Young residents who have access to television express the desire to talk and dress in the way people on the television do. Therefore, there is a strong process of acculturation towards the non-traditional, western lifestyle among the young residents of Makoko, as they perceive this different lifestyle to be better. The young residents furthermore perceive education as the primary gateway to achieve the lifestyle they admire. To them,



having an education promises work and an income and therefore opportunities to attain their objectives.

4.5 QUALITY OF LIFE AS INFLUENCED BY QUALITY OF WATER SUPPLY

For the purposes of determining how the water provision situation in Makoko influences the residents' quality of life, the four criteria in terms of which the residents of Makoko measure their quality of life are compared to the six RDP criteria for basic water supply.

4.5.1 Quantity

The average volume of water used in Makoko is 33 litres per person per day (see Table 3.1). This figure is higher than the RDP minimum of 25 litres per person per day (see Section 2.9.6). The figure of 33 litres per person per day is, however, much lower than the estimated figure of 60 litres per person per day which settlements in the Northern Nsikazi Regional Bulk Water Scheme should theoretically receive (see Section 3.2.1). The fact of the matter is that, due to less water at the individual's disposal than desired, fewer vegetables can be cultivated. The result of this is that there is less variety of food in every household, and that the households' incomes suffer when fewer vegetables are sold (see 4.4.2.1 a).

Thus two necessities for the residents of Makoko's perceived quality of life are influenced negatively by the small volume of water at the residents' disposal per day.

4.5.2 Cartage

Communal water taps that form part of the original design of the Northern Nsikazi Bulk Water Scheme are supposed to be the only water points linked to the temporary reservoir. As a result of private connections and the inadequate storage capacity of Makoko's reservoir, these communal taps yield less water and residents have to fetch water from boreholes (see Sections 3.2.1, 3.2.2, 3.2.3).



The cartage distance thus influences the residents' perceived quality of life negatively in two respects, namely that women spend time that could have been spent on practising horticulture on fetching water and children spend time that could have been spent on their education (homework and studying) on fetching water (see Section 4.4.2.1e).

4.5.3 Availability and assurance of supply

Only 12.7% of respondents to the questionnaire have private connections that yield water on a regular basis (see Section 3.2.2.1). The rest of the residents of Makoko have no assurance of water supply and are subject to erratic water availability (see Section 3.2.2.1).

Lack of assurance of water supply and water availability forces residents to make use of boreholes for their daily water supply. This means that residents have less time per day to spend on the things that, according to the check interview, enhance the residents' quality of life, for example, practising horticulture, doing homework and studying and being able to earn a better income.

4.5.4 Water quality

As mentioned in Section 4.4.1, the quality of the water pumped from the Sabi River to the settlements serviced by the Northern Nsikazi Bulk Water Scheme is good and will not cause health-related problems. Therefore, the quality of the water from the water pipe system cannot affect the Makoko residents' quality of life negatively with regard to their health.

It can be concluded that good water quality does influence the residents' quality of life positively, albeit in an indirect manner and in a way that they do not realise. Since the tap water does not cause any health problems, the residents of Makoko do not suffer disease from drinking tap water. The result is that residents are largely safe from contracting water-borne diseases. It was, however, clear that the residents of Makoko do not perceive the quality of their water as an important aspect in determining their quality



of life. The quality of water only really becomes an issue once it causes visible problems and, as long as the water is, in their opinion, clean and tastes fine, water quality will not be considered to have an influence on quality of life.

4.5.5 Upgrading

As mentioned in Section 2.8.2, the Northern Nsikazi Bulk Water Scheme was designed to accommodate upgrading. This influences the residents' quality of life positively in an indirect manner, since upgrading represents the potential for the water supply problem to be improved. However, until upgrading takes place and further research is conducted on this matter, one cannot be sure what influence upgrading will have on the residents' value judgements.

4.6 VALUE JUDGEMENTS ON WATER AND WATER SERVICES

According to DWAF spokespersons, the fact that residents of the rural settlements in the Nsikazi District are not paying for water services received is a great problem to the water service providers of the district in terms of cost recovery. The DWAF spokespersons indicated that because the residents of the Northern Nsikazi district do not pay for their water supply, the further development of water supply in the district is hampered by a lack of funds. As was mentioned in Section 3.2.1, projects such as DWAF's Northern Nsikazi Reservoirs Project cannot get underway due to this lack of funds. The reservoirs project includes the goal of building permanent reservoirs for Makoko and Phameni, which would significantly reduce the two settlements' water shortage problem (see Sections 3.2.1, 3.2.2), but will still not improve the financial situation of the water providers if people do not pay for the water supply.

Data from the questionnaire showed that 66.6% of respondents are not prepared to pay for their water supply. In order to understand the reasons for this attitude amongst the residents, it is necessary to analyse the residents' value judgements on water as a natural resource and water supply as a service that has to be paid for.



The goal was therefore to determine what the people living in Makoko's value judgements are on water and its sustainable utilisation and procurement. This task had two dimensions. First, the purely cultural dimension of the people of Makoko's value judgements on water as a natural resource is discussed. This knowledge improves understanding of what the residents perceive water as a natural resource without which humans cannot survive. Second, the residents' value judgements on the insufficient water supply are discussed. The second approach does not move away from the cultural dimension of value judgements, but merely focuses on water supply as a distinctly Western aspect of the residents' reality because of the technological implications attached to water supply.

4.6.1 Cosmological perceptions

In order to fully understand the value judgements of a given culture group, it is important to analyse the cosmological perceptions of that culture group. Cosmological perceptions refer to the philosophical explanation of the universe, phenomena and events within the universe and the connection and cohesion thereof, as observed and experienced by people (Coertze and Coertze 1996:159). It is also the result of people's interpretation of reality and phenomena within reality (Coertze and Coertze 1996:159).

The traditional sub-Saharan African cultures incorporate a cosmology that entails five aspects.

- It is holistic. The cosmos is an unbroken entity within which man strives to maintain uniformity, harmony and prosperity. Humans must adapt to the order of nature and must not change or disturb it in any way, since doing so may be detrimental to both humans and nature. Natural resources can be exploited, as nature has the ability to replenish itself.
- It involves a human-centred (anthropocentric) life-view. Humans are central within the cosmos and the most important element. Therefore, discord amongst people can be detrimental to the order of nature, for example, it can be the cause of drought.



- A magical world view is held. In keeping with the concept of holism, there is interaction between the order of nature, humans and the invisible supernatural world. An invisible magical power exists within the cosmos, a power which is part of phenomena or which enfolds phenomena and of which the influence can manifest itself at any time, at any place and in any form.
- A group-directed approach to life is followed. Through upbringing, the individual is systematically incorporated from birth into a family, family group and tribal life. The individual's life thus only obtains meaning within this context. Ancestral spirits are included in this group context and any discord between a person and the ancestors must be rectified as soon as possible to avoid the anger of the ancestors' intervention.
- A cyclic time perception prevails. Life is lived according to the time frame of nature. This is manifested in rituals, which are synchronised with the cosmic cycle. Time perception is focused more on the present and the past than on the future (De Beer 1994:9).

Sub-Saharan African cultures include the traditional African cultures of South Africa and the cosmology outlined above is therefore also applicable among the residents of the research settlements.

4.6.2 Value judgement on water as a natural resource

To understand how water as a natural resource is perceived, it is important to understand how nature is perceived. The *siSwati* word for nature is "*imvelo*".

According to Rycroft (1995: 105), *imvelo* means origin, tradition, nature, custom, habit and instinct. Fowler and Fowler (1969:532) define "nature" as the uncultivated state of plants and animals. The term "*imvelo*" in the Swazi culture thus has a much wider meaning than the term "nature" in Western culture. The Swazi term "*imvelo*" also refers to age-old traditions existing since the origin of human life. Els (1996:395) also discusses this aspect in respect of the Tsonga-term, *ntumbuluko*, which has largely the same meaning.



According to Mbiti (1969:15-16), "Africans have...an extremely anthropocentric ontology in the sense that everything is seen in terms of its relation to man". According to Malan (1988:62), "All natural resources are viewed as having been provided by the Creator in order to meet the demands of man." It therefore makes sense that the *siSwati* definition of nature should include a human aspect since humans are central in the universe and no element is more important than humans.

Els (1996:396) argues that in the general sub-Saharan African perception, humans are central in the universe and everything in the universe is created to maintain human life, because humans are in all aspects dependent on nature to stay alive. Els (1996:396) further states that, given human dependence on nature, humans have the right to exploit all natural resources within their direct environment such as land, water, grazing, plants and wild animals. Els (1996:396) states that, due to this prevailing value judgement, sustainable utilisation (in the Western sense) is not always relevant and that today's needs are more important than tomorrow's problems.

Els (1996:397) attempted to determine whether, due to school education, there has been a change in value judgements amongst the young people from his research area regarding man's dependency on nature to survive. His research proved that young people still see themselves as dependent on nature (Els 1996:401). One of his research results, which is relevant to this study, is that 71.3% of the young respondents stated that nature gives humans and animals water to live. Although Els (1996) writes about the Tsonga of the Mhala district, a similar perception was found among the people of Makoko.

Data from the questionnaire for this study proved that the above value judgements regarding water as a natural resource also prevail amongst the residents of Makoko and Phameni. Part of the questionnaire used in this study included the question: Where does water come from? The three most common answers were:

- from under the ground (24,4% of the respondents);
- from rain (21% of the respondents); and
- from God (19% of the respondents).



A statement made by one of the respondents was that “water is a product of nature and created by God”.

This value judgement on water as a natural resource has a definite influence on the residents’ reluctance to pay for water that they receive through a reticulation network. The quantitative data showed that 66% of the respondents felt they cannot be expected to pay for water. The reasons given for this conviction are two-fold. Some respondents gave their reasons from a cosmological point of view, while others gave their reasons from a viewpoint based on perceptions of reality. Reasons given from a cosmological point of view are following:

- Water is a gift from God, therefore it is free for all.
- Everything needs water to survive.
- Water is a natural thing.
- No one owns water, therefore no one can sell it.
- I have never heard of water being for sale.

These answers indicate that water is perceived as a product of nature and, because humans are part of nature and dependent on nature, everyone has the right to nature’s products, including water. Water is not something that can be given a price. It is something that nature provides for humans to exist and no living person has the right to try and sell it because it belongs to no one in particular, but to everyone.

It is therefore also true that the respondents to the questionnaire did not perceive water from a tap as being any different to water from a stream or fountain. Water in any form is a product of nature. In other words, the respondents did not perceive that they must pay for the **service** (the reticulation network) to have water pumped to their settlement and for the **process** of having this water cleaned. Their perception is that they are expected to pay for water, which to them is something that can under no circumstances be sold. The reason why the respondents do not make the connection between payment and the installation and maintenance of a reticulation network is simply that they do not have knowledge of how a water reticulation system operates, because it has never been



explained to them. The respondents do not have knowledge of the human resources and machinery needed to operate a water reticulation system nor of the costs involved.

4.6.3 Value judgement on the water supply as a service

As mentioned in Section 2.8.2, the Nsikazi district received a water reticulation system for the first time in 1979 and the water reticulation system has been systematically upgraded since then. The residents of the Nsikazi district have never been billed for water services received.

Respondents to the questionnaire gave the following reasons why they believe that they cannot be expected to pay for water supply. These answers are given from a viewpoint based on perceptions of reality as opposed to the cosmological point of view described above, and are arranged in decreasing order of frequency.

- When we were children it was never necessary to pay for water.
- Government must first provide us with jobs so we can afford to pay for water.
- Even if we pay, we have no guarantee that there will be water in the taps.
- If we pay, we will be forced to use less water.
- We use a lot of water when washing clothes, we cannot afford to pay.
- We pensioners cannot afford to pay for water.
- We already pay for electricity, we cannot be expected to pay for water also.

The first answer given by the respondents proves that residents are in the habit of not paying for their water supply because water has always been free. The second answer proves how dependent the residents of Makoko and Phameni are on the government to provide them with what they need to survive. If the government now wants residents to pay for the water that has always been free, then government is also expected to provide them with the means to do so. Thus government must give the residents jobs so that they will be able to afford the water.

The third comment makes a very important point. The respondents are not convinced that paying for the water supply will necessarily assure permanent water supply. The

reality of their everyday situation in the settlement has caused them to distrust the water reticulation system. According to the residents of Makoko and Phameni, the water pipes are the least trustworthy source of water in their settlement, because they provide water very erratically (see Section 3.2.2.1). Residents have, to a great extent, caused the water pipe system's erratic supply themselves due to private connections, but they do not realise this. All they see is that the water taps are dry. Furthermore, residents with private connections have all spent money to have their private connection installed. The result is even less water in the settlement as a whole than before. Thus, to their minds they have already spent money on a water pipe system (private connections) which have turned out to be a "white elephant" and therefore they are reluctant to spend money on something which has, to them, been proven to be unreliable.

The fourth and fifth answers are the respondents' practical conclusions about what paying for water will imply. The residents of Makoko and Phameni know how much water they need to complete their chores each day. The residents are afraid that, when they pay for water, there will not be enough money to afford the huge volumes they use when washing clothes or making bricks. Therefore, they fear they will be forced to use less water per day and that this will cause hardship.

The sixth response focuses on the reality that the pensioners of Makoko and Phameni have very little money (between R350 and R500 per month) and, because of this, they believe that they will never be able to afford paying for water. The pensioners are also less influenced by the drive for modernisation. Their traditional and cultural beliefs remain very strong and they believe that water is a gift from God and free for all, irrespective of how the water is provided.

The seventh answer is also very important. According to spokespersons, Makoko has had electricity since the early nineties (1991/1992). A metering system monitoring the electricity consumption is currently in use in the settlements and the electricity supply is terminated if consumers do not pay their bills. People thus have no choice but to pay for their electricity. Consequently, residents accept electricity as something that must be



paid for, since their electricity supply is otherwise terminated. However, spokespersons from Makoko and Phameni say that electricity cannot be compared to water, because water is a basic human need. Residents also say that they are already paying for electricity, which they consider to be quite expensive, and they feel it is ridiculous to have to pay for water as well because it is not something they feel they have to spend money on.

These statements show spokespersons' conviction that water supply is something that the government has to provide free of charge. The residents are therefore dependent on the government to provide water without which they cannot survive. It creates great confusion amongst residents when the government suddenly demands that residents should pay for a service that they have always received free of charge and that they consider as payment for a commodity which is free anyway. When the situation is observed in this light, one can surely understand why residents are greatly distressed when confronted with the demand that they should pay for water.

It must thus be concluded that residents' unwillingness to pay for water is not unfounded. Indeed, both a deep-rooted culturally determined value judgement and the reality of past experiences cause the unwillingness to pay. One of the main reasons is simply that residents do not realise how a water reticulation system operates. This is also the reason why private connections are such a big problem. Residents do not realise what damage they cause to the entire settlement's water supply when they make these private connections. The fact that there is no community reaction against private connections implies that neighbours cannot be expected to report private connections to the authorities. The fact that the authorities are quite well-informed about the existence, and influence of private connections on the water supply in Makoko and Phameni, also implies an inability or even an unwillingness to act against such offences. One gains the impression that, as long as all the public structures are in place, the reality of the worsening water supply situation is something which will and can be cured by more government spending.



The conclusion that 66% of the respondents who are unwilling to pay for water supply do not understand how a water reticulation system operates is proved when one looks at the remaining 33% of the respondents' reasons for **why they are willing** to pay:

- Money helps to repair the water system.
- Money is needed to clean the water.
- A machine is needed to pump the water.
- DWAF can then implement more water sources.
- If one pays, one will not have problems with water supply.
- Paying will limit the wastage of water.

It is obvious from the above answers that these respondents understand that, for a water reticulation system to operate, money is needed. They are willing to pay their share, because they realise it will mean a more efficient water supply. They understand that they are paying for the **service** of the water supply and not for the water itself. If all residents of the settlement understood this concept, it is very probable that the majority of the residents would be willing to pay for their water supply or at least understand why it is necessary.

It might therefore be a good idea to include the technical aspects of water supply in the school curriculum. This would enable schoolchildren to understand the human resources and machinery needed to ensure the constant pumping of water from the river, storing water in reservoirs as well as the cleaning process. The financial implications of this process must also be explained. This may very well result in a young generation of residents who are willing to contribute to the constructive infrastructure development of their settlement and in its maintenance.

4.7 SUMMARY

Quality of life involves an objective, measurable reality and a subjective, unquantifiable reality. Objective material measures or social indicators, such as mortality rates or, as in this study, water supply, objectively measure people's life conditions in terms of wealth

and health. The subjective approach attempts to measure quality of life in terms of the individuals' assessment of their own life circumstances and life satisfaction, thus emphasising the role of individual perception.

An anthropological approach to measuring quality of life stresses the link between culture and quality of life. Therefore, evaluation of quality of life also entails studying values. Consequently, it is necessary to include the residents of the research settlements' value judgements on water as a natural resource and water supply as a service when determining how water supply influences their quality of life.

In order to determine how water supply as an objective reality (social indicator) influences the residents of the research settlements' quality of life, which in turn is a subjective reality, criteria for both the objective and subjective realities were set.

The RDP minimum standards in terms of quantity, cartage, availability, assurance of supply, quality and upgrading were used as criteria for measuring the research settlements' water supply.

Only three of the RDP criteria for basic water supply are met in the research settlements, namely quantity, quality and upgrading. The remaining three criteria of cartage, availability and assurance of supply are not met. The reasons why the latter three criteria are not met are all rooted in the existence of private connections within the research settlements and the fact that the reservoirs of the settlements have an inadequate storage capacity.

The RDP minimum standard for cartage states that the nearest water point must be within 200 metres of a resident's stand. The current reality is that residents have no alternative but to walk up to one kilometre and wait in the queue at the borehole for almost an hour (see Section 3.2.3.3).

The criterion of availability is also not met, due to the fact that communal water taps yield virtually no water. Therefore, the availability does not adhere to the RDP standard of 10 litres per minute from each outlet (see Section 2.9.6).

The RDP criterion of assurance of supply dictates a raw water supply 98% of the time, with no more than one week's interruption per year. Only 12.7% of private connections yield permanent water supply (98% of the time) from the water reticulation system (see Section 3.2.2.1).

The residents of the research settlements measure their own quality of life (subjective reality) in terms of the following:

- practising horticulture in the hope that it will provide them with a better income and food for their households;
- earning an income, which ensures the ability to provide the household with a house, clothes, and funds to pay for education;
- receiving an education, which holds the promises of a job and therefore a higher income if a job is secured; and
- having a happy family life.

Horticulture is the livelihood of the majority of the residents of Makoko, as it provides the household with the bare necessities in terms of food for the family, but also a small income when crops and vegetables are sold at local markets.

Receiving an income, whether through horticulture, a job or from a pension, is vital to ensure the residents' perceived quality of life. Even though residents can physically survive on produce obtained from horticulture, money is essential to build houses and to buy necessities such as soap and clothes.

The residents of the research settlements perceive having an education as a guarantee of obtaining a job, which they believe the government must give them. Receiving an education is a long-term objective with the end goal of experiencing a higher quality of life. Education is a means to an end. Practising horticulture and having money are short-term objectives aimed at maintaining the day to day quality of life.

Most of the elderly residents of the research settlements did not complete their secondary education and stress the importance of education for their children, because they perceive education as a means of improving the quality of their children's lives.

A satisfactory family relationship at home creates personal fulfillment. Apart from physical and material survival, residents also need to be emotionally fulfilled. The main contribution to this is a happy family life and the latter is thus an aspect that ensures the perceived quality of life of the residents.

Chapter Four has pointed out that in terms of the RDP minimum standard for basic water supply Makoko and Phameni's water supply through the reticulation system is poor, since only three of the six RDP criteria are met. It is also concluded that the poor water supply ultimately has a negative impact on the perceived quality of life of the residents, albeit to a lesser degree on some of the residents' criteria of quality of life than on that of others.

Poor water supply has a negative affect on the cultivation of vegetables. When less water at the individual's disposal, fewer vegetables can be cultivated. The result of this is a smaller variety of food in the settlements' households. The household income also suffers when fewer vegetables can be sold.

The time spent on fetching water from boreholes reduces the time that women spend on horticulture and the time that schoolchildren can spend on their homework. The cartage distance thus influences the residents' perceived quality of life negatively.

A lack of assurance of water supply and erratic water availability force residents to make use of boreholes for their daily water supply. This entails spending a lot of time fetching water, which in turn means that residents have less time per day to spend on the tasks that, according to the respondents, enhance their quality of life.

The quality of the water that is pumped from the Sabi River to the research settlements influences the residents' quality of life positively, as the residents do not suffer from water-borne diseases (see Section 4.4.1), although this is not necessarily perceived within this context by the residents themselves.



The upgrading capacity of the water reticulation system of the research settlements also positively influences the residents' quality of life in an indirect manner, as upgrading represents the potential for the water supply problem to be reduced.

The fourth criterion of the residents' perceived quality of life, namely, a happy family life depends more on the internal family relationship than on external service facilities like water supply. However, one might conclude that the consequences of less food and less income can cause a stressful home environment that might influence a good family relationship negatively.

The fact that residents of the rural settlements in the Nsikazi District are not paying for water services received is a big problem to the water service providers of the district in terms of cost recovery. It also hampers the further development of water supply in the district. The residents of the research settlements are, however, not prepared to pay for their water supply. The reasons given by the residents of the research settlements for not being prepared to pay for water supply are twofold. Some respondents gave their reasons from a cosmological point of view, while others gave their reasons from a reality-oriented point of view.

Reasons given from a cosmologically-oriented value judgement indicate that water is perceived as a product of nature and because humans are part of nature and dependent on nature, everyone has the right to nature's products, including water. Water is something that nature provides for humans to exist and no living person has the right to try and sell water because it belongs to no one in particular, but to everyone.

The residents do not see that one must pay for the **service** of having water pumped to their settlement and for the **process** of having this water cleaned. This is because the residents do not have knowledge about how a water reticulation system operates, because it has never been explained to them.

The reasons given from a reality-oriented point of view for why residents are not prepared to pay for their water supply include the fact that residents are in the habit of not



paying for their water supply because it has always been free. The residents feel dependent on the government which must provide them with the basic needs to survive. The residents are, furthermore, not convinced that paying for their water supply will necessarily assure a permanent water supply. The water pipes are, to the residents, the least trustworthy source of water in their settlement, because they provide water very erratically. The residents fear that should they pay for water there may not be enough money to afford the huge volumes that they use when washing clothes or making bricks and they will therefore be forced to use less water per day, which will cause hardship.

The residents' unwillingness to pay for their water supply is due to a deep-rooted culturally determined value judgement and the reality of past experiences. The residents of the research settlements who **are** willing to pay for their water supply understand that for a water reticulation system to operate, money must be paid. They are willing to pay their share, because they realise it will lead to a higher quality of water supply. If the entire population of the settlement understood this concept, it is very probable that the majority of the residents would be willing to pay for their water supply, or at least understand why it is necessary to do so.



CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 THE EMPHASIS OF THE STUDY

Throughout this study, emphasis was placed on the following aspects:

- the role and function of local government institutions in terms of water provision and the development of water supply in rural settlements;
- the water supply situation in the two rural settlements of Makoko and Phameni in the Nsikazi district of Mpumalanga;
- the water utilisation practices of the residents of Makoko and Phameni as influenced by the water supply situation; and
- the influence of the water supply situation in Makoko on the quality of life of the residents of Makoko.

5.2 CONCLUSIONS

5.2.1 Local government system

The new structure of local government as dictated by law since 1994 does exist within Makoko and Phameni, but the practical functioning thereof is problematic.

The fact that the Nsikazi district was formerly part of the homeland of KaNgwane contributes to the district's disadvantaged status in terms of infrastructure (water supply) and the development of local government institutions. Areas that formed part of South Africa's former homelands are singled out in political documents as being in need of political and infrastructural development. This problem is further exacerbated by the lack of political management capacity within the local government councils of these former homeland rural areas, due to the political transition process of the South African local



government system since 1994, which is not yet clearly understood by these new local government councils.

The policy of the Department of Local Government dictates that RC's should operate under the authority of DC's to provide a temporary political "haven" for these developing and inexperienced councils. This "haven" creates the opportunity for RC's to build their capacity in terms of political management, thus empowering those involved in managing rural government institutions (see Sections 2.9.2, 2.9.3).

Throughout Chapter Two, political documents are cited, giving a theoretical account of the functioning of local government institutions with specific reference to infrastructural development, in this case, the development of water facilities in rural areas (see Section 2.9). The prescriptions for the functioning of local government institutions indicate that to develop the water supply systems of rural areas successfully, the needs of residents of rural settlements in terms of their water supply must be determined and successfully met. This will, according to the legislature, ensure residents' satisfaction with their water supply system and create trust in the local government institutions.

The practical functioning (or lack thereof) of these local government institutions (in Makoko) creates a number of problems that delay the realisation of the functioning of these institutions prescribed by law.

5.2.2 Communication

The researcher's multitude of interviews with officials of DWAF, the local RC and PSC members indicated that the main problem delaying the completion of development projects in rural settlements such as Makoko and Phameni is insufficient communication between, and within the different local government institutions. This specifically refers to communication between individual members of a local government institution, such as the PSC, as well as between local government institutions and the residents of the settlement represented. Examples and repercussions of inadequate communication are discussed in Section 2.10.



In seeking reasons for the inadequate communication within the local government system of rural areas, the following must be borne in mind: communication necessitates technology, but the most basic form of technological communication, namely the telephone, is not something that inhabitants of rural settlements such as Makoko and Phameni have easy access to. In Makoko, only a handful of residents have telephones. The residents who do not have telephones usually make use of the telephones of the few people who have phones, hoping to get messages. This form of communication creates obvious problems, when, for example, the neighbour might not find the person for whom the message is meant right away, and later forgets the details of the message. As mentioned in Section 2.10, this is often the reason why PSC members are not present at all meetings of development projects.

5.2.3 Capacity and experience

Inadequate communication between residents in a settlement and the local government institutions that represent them is the result of the members of such institutions' inexperience in managing such tasks. As was explained in Section 2.10, the members of Makoko's PSC change with every new development project. Thus the experience that PSC members have gained in terms of conveying information about development projects to the residents and conveying the residents' needs and suggestions to the DC and engineers involved is lost to any further project teams. So is the knowledge in development management which is built up through experience.

The quantitative and qualitative research of this study suggested that the residents of small rural settlements such as Makoko and Phameni are not fully aware of the role and function of a local government institution such as the PSC. The residents are, however, aware of which of their fellow residents are members of a government institution such as the PSC. In other words, residents identify with fellow residents whom they know and trust rather than with impersonal institutions. Therefore, not having permanent members on a committee such as the PSC creates confusion amongst the residents with regard to whom they can approach with questions and suggestions on development projects.

Having permanent members on such a committee would ease communication between residents and their representatives and create more stability for all parties involved in the development process. It would also enhance trust in the abilities of such permanent bodies.

5.2.4 Water supply

The main water sources within Makoko and Phameni are the Sabi River (via the reticulation network of the Northern Nsikazi Bulk Water Scheme), boreholes, natural springs and rainwater. Of these five water sources, the residents of the two settlements perceive boreholes to be the most trustworthy water source in terms of assurance of supply and hygiene. Boreholes are, however, not necessarily the most favoured source in terms of accessibility and application.

The residents' knowledge of what a water reticulation system can offer when it operates on a permanent basis creates negative perceptions towards boreholes. Residents realise that a successful tap system is more convenient and less time-consuming than fetching water from other water sources such as boreholes. Therefore, the fact that queuing and walking far distances are always associated with fetching water from boreholes makes borehole water less popular than Sabi River water, because the latter has the potential of being more convenient in the form of individual stand taps. This notion prevails even though the reticulation system from the Sabi River to Makoko and Phameni causes a lot of frustration to residents and yields only a fraction of the volume of water it is designed to yield. A tap system which offers a reliable water source within an acceptable distance from residents' homes is an attractive concept and is considered preferable to walking to a borehole, waiting in a queue, and the physical effort involved in pumping the water and then having to carry it home. The incidence of private connections is directly linked to this. As mentioned in Section 3.2.2, the primary reason why residents install private connections is to have water nearby.



The residents furthermore express a feeling of exasperation towards the government department responsible for the reticulation system, because residents believe government is not interested in solving their water supply problems. Residents are left feeling they have to fend for themselves. Nor do they contribute financially to the maintenance of the system. Residents respond negatively to the idea of a water tariff, indicating that if the government expects them to pay for water, they must firstly receive employment from the government.

The fact that private connections do not fulfil the expectations of the residents causes frustration because, although money was spent on private connections, residents are still compelled to make use of the old system of boreholes, which takes up a considerable amount of time each day.

The fact is that the water supply problem of a settlement can only be alleviated on a permanent basis with the co-operation and support of its residents. At present, the residents seem to be unwilling to lend their support to, and co-operate in salvaging the water supply of their settlement, because they continue to install private connections, and are unwilling to pay for their water supply. As explained in Section 4.6, the residents have, in their opinion, well-founded reasons for not wanting to pay for their water supply. The residents' reluctance to pay is partially due to their limited knowledge of the operation of a water reticulation system, but one can argue that the residents of Makoko and Phameni do not take responsibility for the fact that their private connections to the bulk water supply line is a contributing factor to the problems they experience with the water supply in Makoko and Phameni.

5.2.5 Payment for water

The question is whether the residents will ever be willing to pay for their water supply. The primary explanation of the residents' unwillingness to pay is their cosmological perception of water as a product of nature and therefore not something that has to be paid for. The fact that this cosmological perception is the residents' main argument for their



unwillingness to pay is evidence that there is a fundamental difference between the value judgements of the government and that of the residents. The traditional cosmological value judgement prevails because people genuinely think in this manner and not because it is financially expedient to think this way. The handful of residents who are willing to pay for their water supply accept that operating a water reticulation system and a water purification system costs money. This suggests that there is potential for all residents to grasp the necessity of making a financial contribution to one's own water supply.

A further factor influencing the residents' unwillingness to pay is uncertainty about the costs involved. As residents have never paid a water tariff, they do not know what to expect. Their fears include the fear that they might not be able to afford the water needed for washing clothes or making bricks, as these two chores use a lot of water.

It is imperative that information in this regard should be passed on to residents. Residents need to be eased into the concept of paying for water supply. The best way to initiate this process is to include a course on the technological functioning of a water supply system in the school curriculum as this information can then spread to the different households in the settlements via the children. The financial implications of having a water system must also be explained. The most important aspect of such a course must be to explain what the average cost of water per household per month in Makoko, for example, would be and what contribution these payments would make to the maintenance of the water supply system. In other words, it must be explained that the residents themselves will benefit from paying for their water reticulation system, because the water system will be secure and trustworthy.

Information about the functioning of a water supply system would furthermore contribute to the residents' understanding of the implications of private connections on the settlement's daily quota of available water. The researcher is convinced that the majority of the residents of Makoko do not realise the limiting effect that private connections have on the available volume of water per day, because they do not understand how the system works. Therefore, disseminating information on the technical operation of a water supply



system is the first step towards obtaining residents' cooperation during water development projects that include the repair and prevention of private connections.

A further suggestion on this matter is that the concept of **paying for water** should be reformulated to **paying for the water reticulation system**. It must be explained that no one in South Africa pays for *water*, but in reality people pay for the **installation and maintenance of water reticulation systems**. The fact that people pay according to the amount of water they use is a mere formulation of a system for calculating a payment. People who use more water use the reticulation system more, therefore they pay a higher amount of money. The answers of the 33% of respondents who reacted positively to the question of payment for water in the questionnaire (see Section 4.6.3), support this suggestion.

5.2.6 Quality of life

Chapter Four indicated that the residents of Makoko perceive their quality of life to be influenced negatively by the settlement's water supply situation. However, the question remains whether their quality of life will improve if they have improved access to water.

The fact is that the residents do not necessarily have too little water at their disposal per day but rather that they do not have easy access to water. The boreholes in the settlement yield enough water to provide the residents with more than the RDP minimum volume of 25 litres per person per day, but not within the RDP minimum distance of 200 metres from stands (see Section 2.9.6).

The residents feel that the hours spent on fetching water each day reduces the time they can spend on daily activities that increase their quality of life, such as cultivating vegetable gardens and studying, which are both perceived as gateways to increased income. Residents also say that upgrading the water supply system would improve the yield of vegetable gardens and therefore the household would have more vegetables to sell and thus have a higher monthly income. Schoolchildren and tertiary students would



also have more time to spend on their studies, which, according to the residents, increases their potential of obtaining a job that pays a good salary.

As mentioned in Section 2.10, the four different water development projects planned for Makoko will upgrade the water supply via the reticulation system to the RDP minimum standard. The result of this would be that residents would no longer have to walk to boreholes and stand in queues to fetch water for the household. The residents would need to walk a maximum distance of 200 metres to a communal water tap and receive water from the outlet daily at a flow rate of 15 litres per minute (see Section 3.2.1). The influence of private connections on this system is, however, not taken into account in these projections.

However, an improved water supply is not in itself enough to improve the residents' quality of life. The aspects of everyday life that, according to the residents, influence their quality of life, are all activities the success of which depends on the actions of individuals. For example, easier access to water will surely create more time and mean less effort to cultivate vegetable gardens, but the quality and quantity of the yield of vegetable gardens depends on the farmer as individual. Additional personal effort in getting water to the vegetable garden, for example using animal traction, is surely the first step to solving the problem of irrigation. The same can be said for education. Residents say that less time spent on fetching water means more time spent on studying, but the academic success of a student surely depends more on the diligence of the student than on the effect of external factors.

Consequently, residents' improved quality of life is dependent on their own increased efforts in the activities that influence their quality of life, together with improved facilities such as water supply. It must therefore be concluded that an improved water supply creates the potential for a higher quality of life, but that the realisation of that dream remains in the hands of the residents themselves.

Whether the residents' ideals regarding the enhancement of their perceived quality of life due to improved water provision will be realised, is a question that can only be answered



when the activities of the residents of Makoko in respect of their own efforts in enhancing their quality of life are studied after the upgrading of the water supply.

5.2.7 Difference in value judgements

An important conclusion derived from the research is that there is a lack of agreement between the government's philosophy regarding water supply development and the reality of the management thereof.

The South African government's development policy is based on a western philosophy focusing on individualism. This implies that each individual South African citizen is expected to play an active role in his or her own development. In other words, it is the perception of the government that every citizen of South Africa has the right to water at the minimum standard set by the government. Parallel to this vision, each individual citizen has the obligation to pay for the service of providing water via water supply systems. This philosophy is based on the assumption that all individuals whose lives are affected by development projects (for example, water supply) are in favour of development, since development is equal to progress.

By contrast, the residents of Makoko's perceptions are that they have the right to the infinite consumption of water because water is and always has been provided by nature.

As to the residents' perception of water supply development, the time spent with the residents of Makoko has convinced the researcher that the general perception is that development equals improvement, but does not necessitate change. It has to be borne in mind that the residents of rural settlements such as Makoko have had very little exposure to the "outside" modern world and those who have are mostly the younger generation (see Section 4.6). Consequently the residents are at ease with that which is familiar and are sceptical towards anything new that takes them beyond their so-called comfort zone.

This does not mean that the residents respond negatively to all aspects of development. In the case of water supply development, the residents of Makoko are eager to receive



water by means of a reticulation system (improved water supply). A water reticulation system represents a major improvement in water supply and subsequently also influences their water utilisation practices in general (obtaining water is less time-consuming and more water is available). The important point is that everything that comes with a water reticulation system is beneficial to the residents' lives and daily routines, except one major change, namely paying, and paying for water services is perceived to have a potentially negative impact on the manner in which they can make a living.

In other words, the residents embrace development (improvement), as long as it does not necessitate too much sacrifice (change) in return. That which development offers, such as more water, and which the residents actively feel makes their lives better, is readily accepted. But, those changes which development necessitates and that the residents perceive as a burden, such as having to pay for a better water supply, might never be accepted, even if carrying the burden means enjoying the benefits of development (improvement).

One could conclude that, because of this attitude towards the context implicit in the concept development as it is generally understood by government, it may be that the residents of Makoko are not desperate to improve their water supply because they are not prepared to make sacrifices for that change. Thus the following question now arises: If the residents are not desperate for an improved water reticulation system, why do they proclaim that their quality of life is affected negatively by their current water supply status? Why are they so sure that an improved water supply will have a positive effect on their quality of life?

One could conclude that the residents have been exposed to the benefits of a water reticulation system and have learnt that their daily lives would be easier if they had access to an improved water reticulation system. The reasons for wanting an improved water reticulation system might therefore not be related to the enhancement of quality of life at all. It might just be a question of convenience rather than a question of necessity. It must be borne in mind that the residents of Makoko have never had access to a water



reticulation system. Only now, when they are exposed to the benefits of it, do they realise that their quality of life could be improved by it. In the light of this, they perceive their current way of life to have a lesser quality than it could have with improved water technology, that is, if such technology is trustworthy.

A point that must be borne in mind is that development in the former homelands was implemented in such a manner that government provided and at the same time was also responsible and accountable for any services rendered. This historical situation has created a perception among residents of the former homelands that the government will always provide services. This perception, coupled with the African principle of “*ubuntu*”, further clouds the issue of responsibility for development, because government is still perceived as provider, albeit within a totally new paradigm.

Politicians currently in power have promised that they will enhance the quality of life of all South Africans, as the so-called legacy of Apartheid did not. The fact is, however, that the government just does not have the funds to keep its promises. Moreover, rural communities do not easily grasp the principle that the country's money can be “used up”. They therefore wait and hope that the government will provide services, because the government “knows” that the rural communities cannot be expected to pay for services because the rural poor have always been down-trodden and discriminated against.

So what must be done to solve the problem that the residents are not willing to pay for improved water supply and the fact that the residents reduce their own daily water supply by installing private connections? There are two alternatives. One is that the water service authorities of rural areas can continue to “turn a blind eye” to the installation of private connections and continue to delay solving the problem of the residents’ unwillingness to pay, thereby letting the problem reach enormous proportions, with the entire population of South Africa suffering the consequences.

The other alternative is to “convince” rural residents to pay for their water supply, however small their contribution might be. Anthropological literature states that the aspect of culture that changes most slowly and with most difficulty are value judgements



(see Section 1.5.1). For rural residents to be willing to pay for water supply, a change or at least a shift in their value judgements is essential. It is obvious that to achieve this shift will be a long and difficult task. The best way is to tackle the process through the provision of information (see Section 5.2.5). If rural schools start this process now, a change in the negative attitude towards paying for a water reticulation system may only be present within one generation.

In the end, there are certain realities in life which not even cultural determinants can ignore. One of these is the fact that one has to pay for pipes if one wants water at home. It is, however, also clear that the official local authority institutions will have to take more responsibility in respect of the installation and maintenance of water supply systems. If this level of authority does not take responsibility, it means that provincial government departments have to work directly with communities at the local level. This is an impossible situation, as such departments just do not have the capacity to do this. Local government officials are, after all, representatives of their own people and should take responsibility for the development of the infrastructure their people need. They should then also take responsibility for receiving payment for the services they provide to their people.

5.2.8 The position of the *sikhulu* and the indigenous authority system

It has been observed during the research that developers such as engineers tend to underestimate the powerful role and influence of the traditional leaders of a settlement, in other words, the *sikhulu* and his councillors, over their people. Due to the establishment of local government institutions through which development projects are facilitated, the involvement of the *sikhulu* and the indigenous authority in the development process becomes a matter of secondary importance to developers. The researcher observed this to be a point of concern.

As a matter of courtesy, most developers do inform the *sikhulu* of their goal and of their presence in the settlement. However, developers never really involve the *sikhulu*



throughout the entire development project. This might be due to the developers' belief that the onus rests with the *sikhulu* to involve himself when he feels it is necessary. The fact remains, however, that, in most cases, the *sikhulu* expects the developers to keep him informed of all activities taking place in his tribal area.

The point that needs to be made here is that when one is dealing with a difficult issue such as local unwillingness to pay for water supply services, success might be more easily achieved when approaching the residents through the correct and accepted channels of indigenous authority. This means that the message stating the importance of paying for one's own water reticulation system should come from the *sikhulu* and not from the engineer. When trying to convince residents to pay for water reticulation systems, would it not be easier to reason with them if their *sikhulu* echoed the developers' sentiments?

This obviously means that the *sikhulu* must be convinced that he and his people will benefit from changes brought about in their lifestyles by being responsible for their own water reticulation systems, and therefore paying for the installation and maintenance of such a system which is to their benefit.

5.2.9 Future research possibilities

As mentioned in Section 1.5, this study was done from 1997 to 1999. The South African government's policy regarding water supply and water services underwent a transformation process during this time. The *White Paper on Water Supply and Sanitation* of 1994 developed into the *Water Services Act* (Republic of South Africa 1997). Later the *National Water Act* (Republic of South Africa 1998) was also published. According to spokespersons from DWAF in Pretoria, the basic principles of water supply remains the same in the *Water Services Act* (Republic of South Africa 1997) as the policy described in the White Paper of 1994, which was referred to in this study.

Nevertheless, the new *Water Services Act* (Republic of South Africa 1997) defines the South African government's policy on water supply and provides a "regulatory framework for water services institutions". The new *National Water Act* (Republic of

South Africa 1998) provides “a fundamental reform of the law relating to water resources” and describes the new policy of water resources management which aims for sustainable use of water for the benefit of all.

These two Acts thus represent the government’s strategy for providing water services in South Africa. The current government focuses on rectifying the uneven distribution of the national water resource and on providing equal access to water for all South African citizens.

Future research can therefore focus on evaluating the success of the implementation of these new policies in rural areas. Such research studies can make a valuable contribution to water services institutions by pointing out aspects of the legislation that are problematic within rural areas and by helping to smooth out such problems.

Examples of such future research themes could include the following:

- The policy of water payments needs a lot of ground level evaluation in order for it to be implemented successfully. Research focused on answering questions such as “Can rural residents pay for water?” will shed light on this controversial issue. Water vendors are a common phenomenon in some rural areas in South Africa, which obviously implies that in some cases rural residents can and do pay for water (or rather, the service of providing it).
- Water payment studies can be complemented with research focusing on **demand responsive development** of water supply. Such studies could research the specific aspects of water needs among rural residents answering questions such as “How much water does one rural household **need** per day?” and “What water sources do they **want** to use?”. Costly bulk water meter systems providing purified water might not be the only option for water supply development. Small dams providing unpurified water for activities like cultivating vegetable gardens might be a cheaper and less time-consuming option for alleviating water shortages.



- Local government can benefit from research studies focused on ways to incorporate rural residents in decision-making structures such as Catchment Management Forums. Making rural people part of the whole development process is the first step towards demand responsive development.

Such intensive studies evaluating DWAF's progress can help the department to reach its goal of "Some for all, forever"!

REFERENCES

- Allen, C.J. 1974. *Dimensions of Swazi households in rural and urban areas*.
Unpublished PhD Thesis: University of Massachusetts.
- Allen, R. 1980. *How to save the world*. London: Kaogan Page.
- Atte, O. D. 1983. "From inside looking out: An emic perspective of life quality in rural Nigeria. A case study from Kwara state, Nigeria." In: Igbozurike, U. & Raza, R. (eds.). *Rural Nigeria: Development and quality of life*. Proceedings of the seminar on "Quality of life in rural Nigeria". Ilorin: Agricultural and Rural Management Training Institute.
- Barlett, P.F. and Brown, P.J. 1992. "Agricultural development and the quality of life." In: Podolefsky, A. & Brown, P.J. (eds.). *Applying Anthropology. An introductory reader*. 2nd ed. Mountain View: Mayfield Publishing Co.
- Breytenbach, W.J. 1975. *Tuislande: Selfregering en politieke partye*. Mededeling van die Afrika-Instituut nr. 28. Pretoria: Afrika-Instituut.
- Briscoe, J. and De Ferranti, D. 1988. *Water for rural communities. Helping people help themselves*. Washington, DC: The World Bank.
- Burger, M. 1992. *Verwysingstegnieke*. Pretoria: Universiteit van Pretoria.
- Casley, D.J. and Lury, D.A. 1987. *Data collection in developing countries*. Oxford: Clarendon Press.
- Coertze, P.J. 1980. *Filosofiese en metodologiese grondslae van die Volkekunde*. Johannesburg: Lex Patria.

- Coertze, P.J. and Coertze, R.D. 1996. *Verklarende vakwoordeboek vir Antropologie en Argeologie*. Pretoria: R.D. Coertze.
- Coertze, R.D. 1978. "Teorie en navorsing". *Suid-Afrikaanse Tydskrif vir Etnologie*, 1(2).
- Coertze, R.D. 1993. "Deelnemende waarneming en waarnemende ondervraging of ondervraging in diepte". *Suid-Afrikaanse Tydskrif vir Etnologie*, 16(3).
- De Beer, F.C. 1994. "Benutting van hernubare hulpbronne: persepsies van swartes in die noordstreek van Suid-Afrika". *Suid-Afrikaanse Tydskrif vir Etnologie*, 18(1).
- Department of Constitutional Development. 1998. *The White Paper on Local Government*. Pretoria: Ministry of Provincial Affairs and Constitutional Development.
- Department of Water Affairs and Forestry. 1994. *Water supply and sanitation policy White Paper. Water – an indivisible national asset*. Pretoria: Department of Water Affairs and Forestry.
- Development Bank of Southern Africa. 1985. *KaNgwane, development information*. Sandton: Data Bank, Development Bank of Southern Africa.
- Dube, S.C. 1988. *Modernization and development. The search for alternative paradigms*. London: Zed Books.

- Els, H. 1994. “Werknemers van die Nasionale Krugerwildtuin se waarde-oordele oor aspekte van die natuur en natuurbewaring”. *Suid-Afrikaanse Tydskrif vir Etnologie*, 17(4).
- Els, H. 1996. *Die benutting van hernubare natuurlike hulpbronne by die Vanhlanganu-Mnisi van die Mhaladistrik*. Ongepubliseerde DPhil proefskrif. Pretoria: Universiteit van Pretoria.
- Fowler, F.G. and Fowler, H.W. 1969. *Pocket Oxford dictionary*. Oxford: Clarendon Press.
- Fuggle, R.F. 1992. “Environmental management: an introduction”. *Environmental management in South Africa*. In: Fuggle, R. and Rabie, M.A. (eds.). Cape Town: Juta.
- Ghai, D.P. (eds.). Khan, A.R., Lee, E.L.H., Alfthan, T. 1977. *The basic needs approach to development*. Geneva: International Labour Office.
- Hartman, J.B., Kriel, J.D., Els, H. and Wasserman, I. 1993. *Report on the development of tribal authorities in Gazankulu*. Pretoria: The Authors.
- Headey, B. 1981. “The quality of life in Australia”. *Social Indicators Research*, 9(2).
- Howard, M.C. and Dunaif-Hattis, J. 1992. *Anthropology – Understanding human adaptation*. New York: Harper Collins.
- Jacobs, P.P. and Pauw, H.C. 1995. “Lewensgehalte van ‘n landelike gemeenskap”. *Suid-Afrikaanse Tydskrif vir Etnologie*, 18(3).

- Jonas, P.J. 1983. "Lewensgehalte – 'n moontlike volkekundige benadering". *Suid-Afrikaanse Tydskrif vir Sosiologie*, 14(3).
- Kearney, M. 1984. *World view*. California: Chandler & Sharp.
- Kottak, C.P. 1987. *Cultural Anthropology*. New York: Random House.
- Kriel, J.D. 1992. *Die siektebegrip van die Noord-Sotho*. Ongepubliseerde DPhil Proefskrif. Pretoria: Universiteit van Pretoria.
- Kuper, H. 1963. *The Swazi: A South African kingdom*. New York: Holt, Rinehart & Winston.
- Landro, M. 1989. *Changing world view of Nguni Africans and its implementation for Norwegian pentecostal missionaries*. Unpublished PhD dissertation. Michigan: School of World Mission.
- Mabogunje, A.L. 1980. *The development process: A spatial perspective*. London: Hutchinson University Library.
- Mabuza, E.J. 1983. *KaNgwane – The road ahead*. Potchefstroom: PU for CHE, Institute for Political and Africa Studies.
- Macnamara, M. (ed.) 1980. *World views*. Johannesburg: Van Schaik.
- Makombe, K. (ed.) 1993. *Sharing the land: Wildlife, people and development in Africa*. Harare: IUCN Regional Office for Southern Africa.
- Malan, J.S. 1988. "The cosmological factor in development programmes". *Suid-Afrikaanse Tydskrif vir Etnologie*, 11(2).

- Marwick, B.A. 1966. *The Swazi: An ethnographic account of the natives of the Swaziland Protectorate*. London: Cass.
- Mbiti, J.S. 1969. *African religions and philosophy*. London: Heineman.
- Mitchell, J.C. (ed.) 1980. *Numerical techniques in Social Anthropology*. Philadelphia: The Institute for the Study of Human Issues.
- Möller, V. 1992. *Quality of life in unemployment: a survey evaluation of black township dwellers*. Pretoria: HSRC Publishers.
- Mouton, J. and Marais, H.C. 1989. *Metodologie van die geesteswetenskappe: Basiese begrippe*. Pretoria: Raad vir Geesteswetenskaplike Navorsing.
- Mukherjee, R. 1983. *Classification in social research*. Albany: State University of New York Press.
- Oruka, H.O. 1987. "African Philosophy: A brief personal history and current debate". In: Floistad, G. (ed.). *Contemporary Philosophy*, Vol. 5.
- Rautenbach, P.S. 1973. "Suid-Afrika binne Afrika verband: hulpbronne." In: Coertze, P.J. (ed.) *Suid-Afrika binne Afrika verband*. Pretoria: HAUM.
- Romney, D.M., Brown, R.I. and Fry, P.S. 1994. "Improving the quality of life: Prescriptions for change". *Social Indicators Research*, 33(1-3).
- Rycroft, D.K. 1995. *Concise siSwati dictionary*. Third edition. Pretoria: Van Schaik.

- Sami, K. and Murray, E.C. 1998. *Guidelines for the evaluation of water resources for rural development with an emphasis on groundwater*. Report to the Water Research Commission. Grahamstown: Rhodes University.
- Sentrale Statistieke. 1991. *Bevolkingsensus. Geografiese verspreiding van die bevolking met 'n oorsig vir 1970-1991*. Pretoria: Sentrale Statistieke Biblioteekdiens.
- Schlemmer, L. 1990. "Data collection among black people in South Africa with particular reference to structured individual interviews". In: Hugo, P. (ed.) *Truth be in the field: Social sciences research in Southern Africa*. Pretoria: University of South Africa.
- Schnetler, J. 1989. "Beginsels van vraag- en vraelyskonstruksie". In: Schnetler, J. (red.) *Opsamelmodes en praktyk*. Pretoria: Raad vir Geesteswetenskaplike Navorsing.
- Smedley, L.N. 1979a. "The assessment of quality of life". *Humanitas*, 5(3).
- Smedley, L.N. 1979b. *The concept of "quality of life" and its implications for housing research*. Pretoria: Human Sciences Research Council.
- Stoker, D.J. 1989. "Basiese steekproefnemingsmetodes". In: Schnetler, J. (red.) *Opsamelmodes en praktyk*. Pretoria: Raad vir Geesteswetenskaplike Navorsing.
- Streeten, P. and Burki, S.J. 1978. "Basic needs: Some issues". *World Bank Development (Washington D.C.)*, No 6.

Van Schalkwyk, A. 1996. *Guidelines for the estimation of domestic water demand of developing communities in the Northern Transvaal*. Report to the Water Research Commission. Pietersburg: Water Systems Management.

Van Warmelo, N.J. 1935. *A Preliminary survey of the bantu tribes of South Africa*. Pretoria: Government Printer.

OFFICIAL FILES AND ACTS

Republic of South Africa. 1927. Black Administration Act. Act No 38. Pretoria: Government printer.

Republic of South Africa. 1929. Black Administration Act, Amendment Act. Act No 9. Pretoria: Government printer.

Republic of South Africa. 1951. Black Authorities Act. Act No 68. Pretoria: Government printer.

Republic of South Africa. 1956. Water Act. Act No 54. Pretoria: Government Printer

Republic of South Africa. 1962. Proclamation 1291. Government Gazette. 17 August. Pretoria: Government Printer.

Republic of South Africa. 1971. Constitution of Self-Governing Territories. Act No 21. Pretoria: Government Printer.

Republic of South Africa. 1993. Constitution of the Republic of South Africa. Act No 200. Pretoria: Government Printer.

Republic of South Africa. 1993. Local Government Transition Act. Act No 209.
Pretoria: Government printer.

Republic of South Africa. 1997. Water Services Act. Act No 108. Pretoria:
Government printer.

Republic of South Africa. 1998. National Water Act. Act No 36. Pretoria:
Government printer.

Van Warmelo. 1942. File 33-35. "Chiefs and Tribes of the Nelspruit District". Former
Department of Native Affairs, Pretoria.

Van Warmelo. 1943. File 35-37. Former Department of Native Affairs, Pretoria.

Van der Merwe. 1992. File 35-36. "Preliminary Ethnological Report". Department of
Regional and Land Affairs, Pretoria.

Makoko Needs Assessment. 1996. Reconstruction and Development Committee,
Kabokweni.

Phameni Needs Assessment. 1996. Reconstruction and Development Committee,
Kabokweni.

PERSONAL COMMUNICATION

Boonzaaier, C.C. (Prof.) 1998 and 1999. Department Anthropology and Archaeology,
University of Pretoria.

Els, H. (Prof.) 1998 and 1999. Department Anthropology and Archaeology, University
of Pretoria.



Van Oudtshoorn, J. (Mr) 1999. SMS Afriwater, Nelspruit.



APPENDIX 1



Name of student

Date

Name of interpreter

Time

Name of resident

Questions

1) What is your position in the household

Uyini wena lapha ekhaya

Mother	1	Grandmother	2	Daughter	3	Granddaughter	4	Sister	5
Father	6	Grandfather	7	Son	8	Grandson	9	Brother	10

2) What is the name of your neighbourhood

Ngabe uhlalaphi

Makoko A	11	Makoko B	12	Mashonisa	13		
Phameni A	14	Phameni B	15	Phameni C	16	Phameni D	17

3a) Do you have a tap on your stand

Unayo yini iphayiphi ekhaya lakho

Yes	18	No	19
-----	----	----	----

3b) When was it installed

Wayifaka nini

3c) Why did you install this tap at your home

Kungani ufake leliphayiphi ekhaya lakho

3d) How much did it cost to install this tap

Kwakudla malini kufaka leliphayiphi



4a) Did you and your neighbours put money together to make the connection to the main pipe

Ingabe wena nabomakhelwane bakho nihlangane nanifaka leliphayiphi

Yes	20	No	21
-----	----	----	----

4b) How many households were in your group

Nibangaki kulenhlanganyela

4c) How much did each household pay to make the connection

Nikhokha malini ngelikhaya

4d) What did you buy with this money

Nitsengani ngalemali

5a) Who made the connection to the main pipe

Ngubani lonifakele leliphayiphi

5b) Why this person

Kungani kube ngulomuntfu

6) How many days per month do you have running water from your tap at home

Mangaki malanga enyangeni lekuba nemanti ephayiphini ekhaya lakho

1	22	2	23	3	24	4	25	5	26
6	27	7	28	8	29	9	30	10	31
11	32	12	33	13	34	14	35	15	36
16	37	17	38	18	39	19	40	20	41
21	42	22	43	23	44	24	45	25	46
26	47	27	48	28	49	29	50	30	51



7a) At what hours of the day do you have running water from your tap at home

Ngusiphi sikhatsi ngelilanga lapho manti atfolakala ngaso ephayiphini lasekhaya lakho

7b) What is the reason for this

Yini sizathu saloko

8a) Did you get a permit to make the connection

Unayo imvuma yokufaka lamanti

Yes	52	No	53
-----	----	----	----

8b) Describe the process you went through to get this permit

Chaza kwekutsi uyitfole kanjani lemvumo yokufaka lamanti

9a) What does the term “private connection” mean to you

Chaza leligama lekufaka ngasese kutsi lishoni

9b) Do you have a “private connection”

Ungabe ufakile ngasese

Yes	54	No	55
-----	----	----	----

9c) What is the effect of “private connections” on the community’s water supply

Kutobanjani emphakhatsini uma wonke umuntfu afake ngasese



10a) Do you still fetch additional water on the days your tap gives water

Uyakha manti ngaphandle nangabe manti ephayiphinina

Yes	56	No	57
-----	----	----	----

10b) How many times do you fetch water in a day

Tingaki tikhatsi lokha ngato manti ngelilanga

1	58	2	59	3	60	4	61	5	62
---	----	---	----	---	----	---	----	---	----

10c) At what different times in the day do you go to fetch water

Ngutiphi tikhatsi letihlukene lokha ngato emanti ngelilanga

4 am-5 am	63	5 am-6 am	64	6 am-7 am	65	7 am-8 am	66	8 am-9 am	67
9 am-10 am	68	10 am-11 am	69	11 am-12 pm	70	12 pm-1 pm	71	1 pm-2 pm	72
2 pm-3 pm	73	3 pm-4 pm	74	4 pm-5 pm	75	5 pm-6 pm	76	6 pm-7 pm	77

10d) How long does it take each different time

Kukutsatsa sikhatsi lesinganani

10e) Why do you fetch water this time of day

Kungani ukhe manti ngalesikhatsi ngelilanga

11a) How many containers do you usually fill in a day

Ugcwalisa mabhakede mangaki ngelilanga

1	78	2	79	3	80	4	81	5	82
6	83	7	84	8	85	9	86	10	87
11	88	12	89	13	90	14	91	15	92

11b) How much water do the water containers hold

Anganani lamanti lewuwagcwalisa lamabhakede

20 litres	93	25 litres	94	40 litres	95	50 litres	96
-----------	----	-----------	----	-----------	----	-----------	----



12a) What tipe of waterpoint do you use

Ukha kuphi emanti

Tap	97	Handpump	98	Fountain	99
-----	----	----------	----	----------	----

12b) Why do you use this waterpoint

Kungani usebentise lawamanti

12c) How far is this waterpoint from your home

Asekudzeni nganani lamanti nasekhaya

50 m	100	100 m	101	200 m	102	500 m	103	1 km	104
------	-----	-------	-----	-------	-----	-------	-----	------	-----

13) How many working handpumps are in your community

Mangaki maphayiphi (boromachine) esandla emphakatsini lasebentako

1	105	2	106	3	107	4	108	5	109
---	-----	---	-----	---	-----	---	-----	---	-----

14) How do you take the water you fetched home

Uwafutsa ngani aye ekhaya

Wheelbarrow	110	On head	111
-------------	-----	---------	-----

15) How many people use the water that you take home

Bangaki bantfu labasebentisa lamanti ekhaya

--



16) What will you use the water for. How much water do you use for each chore and indicate how many days per week you perform each chore

Anganani manti lowasebentisa kuloku lokulandzelako, kantsi chaza kutsi mangakhi malanga ngeliviki losebenta loku lokulandzelako

Chore	How much water	Days per week
Cooking Kupheka		
House cleaning Kukolobha		
Washing clothes Kuwasha tingubo		
Bathing Kugeza umtimba		
Drinking Kunatsa		
Watering garden Kutselela		
Making bricks Kubhaka tinini		
Pit toilet Kutsela manti emgodwini wethoyilethe		
Water for animals Manti emfuyo		

17a) Do other members of your household also fetch water except you

Ingabe labanye bomndeni wakho bayakha emanti ngaphandle kwakho

Yes	112	No	113
-----	-----	----	-----

17b) Who are they

Ngubobani labo

Mother	114	Grandmother	115	Daughter	116	Sister	117	Granddaughter	118
Father	119	Grandfather	120	Son	121	Brother	122	Grandson	123



18a) Is there usually a queue at the waterpoint

Ingabe sonkhe sikhatsi kuhlala kugcwele lapho kukhiwa khona emanti

Yes	124	No	125
-----	-----	----	-----

18b) What time of day is the queue the longest

Ngisiphi sikhatsi ngelilanga lapho kuhlala kugcwele

Early morning	126	Late morning	127	Midday	128	Late afternoon	129	Early evening	130
---------------	-----	--------------	-----	--------	-----	----------------	-----	---------------	-----

18c) Why do you say so

Kungani usho kanjalo

18d) How long do you wait

Utsatsa sikhatsi lesinganani ulindzile

15 min	131	30 min	132	1 hour	133	2 hours	134	3 hours	135
--------	-----	--------	-----	--------	-----	---------	-----	---------	-----

18e) Is the queue longer over weekends

Ingabe kugcwala kakhulu ngempelasontfo

Yes	136	No	137
-----	-----	----	-----

18f) Why do you say so

Kungani usho kanjalo

19a) Do you ever collect rain water for domestic use

Ingabe uyawakhangetela manti emvula

Yes	138	No	139
-----	-----	----	-----

19b) How do you collect rain water

Ukhangetela kanjani



19c) What do you use rain water for

Uwasebentiselani manti emvula



Value judgment

1) Where does water come from

Abuyaphi emanti

2a) Who is in charge of the water supply you use here

Ngubani lomele lemanti emphakatsini walapha

--

2b) Why do you say so

Kungani usho kanjalo

3a) Do you know about the Project Stearing Commitee

Ingabe niyalati lelikomiti (PSC) lelinimele

Yes	150	No	151
-----	-----	----	-----

3b) What work does this commitee do

Nguwuphi umsebenti lowentiwa ngulelikomiti

3c) Who are the members of this commitee

Ngubobani malunga alelikomiti



4a) Do you save water

Uyawonga emanti

Yes	152	No	153
-----	-----	----	-----

4b) How do you save water

Uwonga kanjani emanti

4c) Why do you save water

Uwongelani emanti

5a) Is it necessary to pay for water

Kubalulekile kubhadala manti

Yes	154	No	155
-----	-----	----	-----

5b) Why do you say so

Kungani usho kanjalo

6) What work does DWAF (Department of Water Affairs and Forestry) do

Yini umsebenti lowentiwa ngu-DWAF (Department of Water Affairs and Forestry)

7) What is the job of the TRC (Transitional Representative Council)

Yini umsebenti we-TRC (Transitional Representative Council)



8) Which illnesses do they get

Kugula lokunjani lebakutfolako

9) From which source do they get which illnesses

Bakuthola kuwaphi manti lokugula

Sabi river

Borehole

Fountain

Rain water



Water quality

1) Which water source do you prefer

Nguwaphi manti leluwatsembako

Sabi river	140	Borehole	141	Fountain	142	Rain water	143
------------	-----	----------	-----	----------	-----	------------	-----

2) Why do you say so

Kungani usho kanjalo

3) Which source do you think has the healthiest water

Nguwaphi manti leluwabona kutsi anempilo

Sabi river	144	Borehole	145	Fountain	146	Rain water	147
------------	-----	----------	-----	----------	-----	------------	-----

4) Why do you say so

Kungani usho kanjalo

5) How is water from the Sabi river purified

Manti aseSabi River ahlotjiswe njani

6) Do people ever get ill from any water they drink

Ingabe bantfu baye bagule ngekunatsa manti

Yes	148	No	149
-----	-----	----	-----

7) Why do they get ill

Bakutfole kanjani lokugula



8a) Who is responsible to ensure that there is always water available for the community

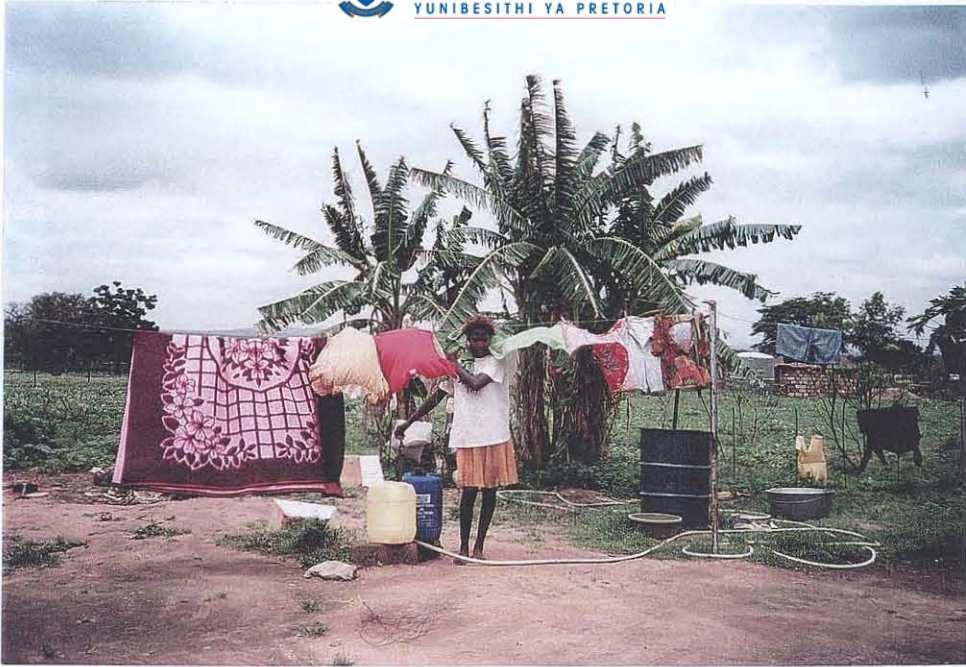
Ngubani lobonako ngaso sonkhe sikhatsi kwekutsi manti ahlala akhona emphakatsini

8b) Why do you say so

Kungani usho kanjalo

Time

FIGURE A1



Private water connection with a tap on a resident's stand

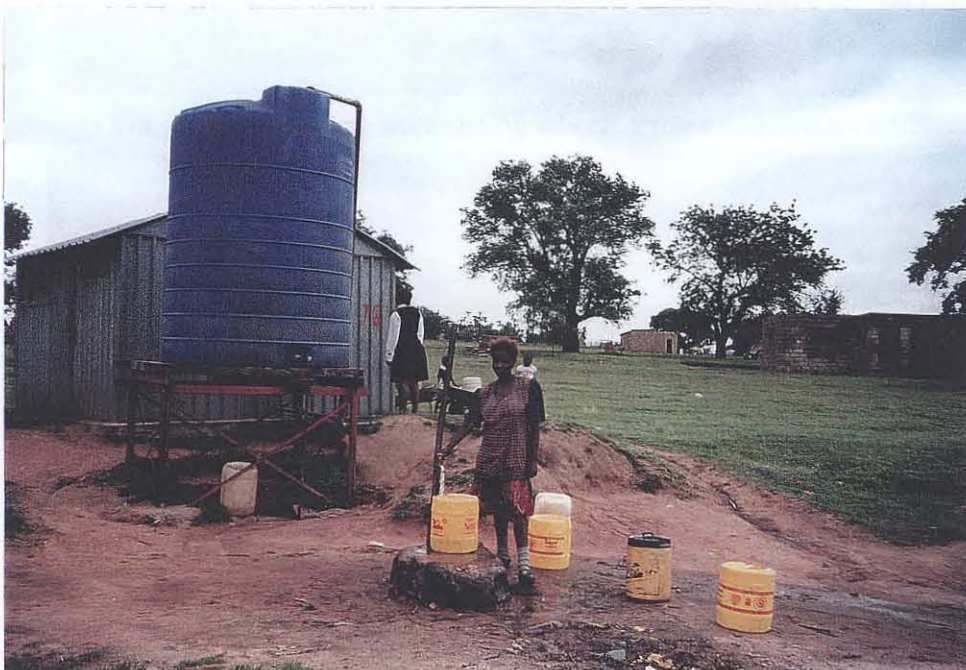


FIGURE A2

Communal water tap connected to a water tank, which is connected to a diesel water pump located in the corrugated iron shelter in the background

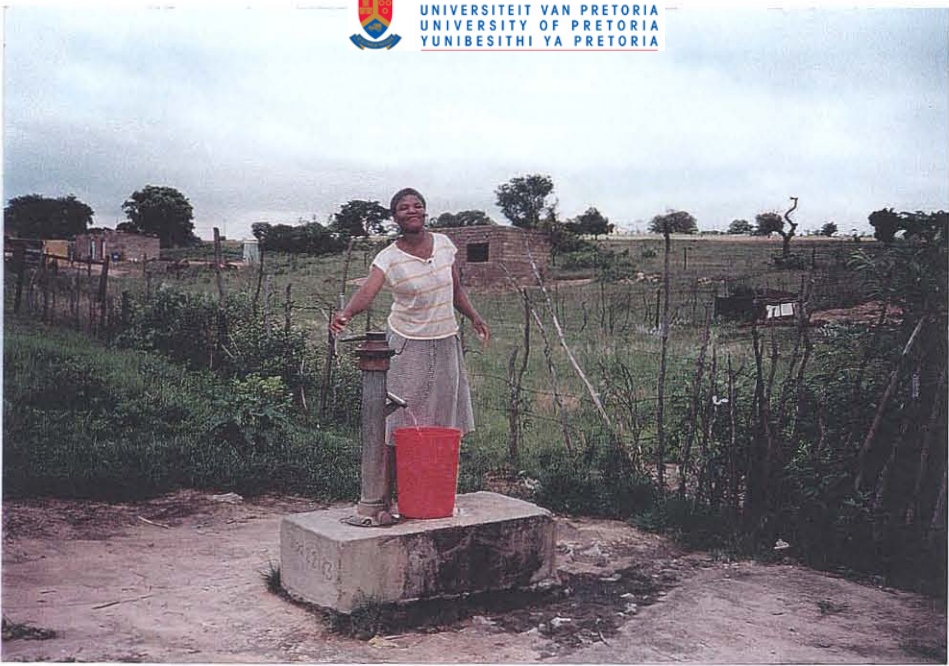


FIGURE A3

Rotary screw handpump with single bar



FIGURE A4

Young boys fetching water using wheelbarrows and water containers

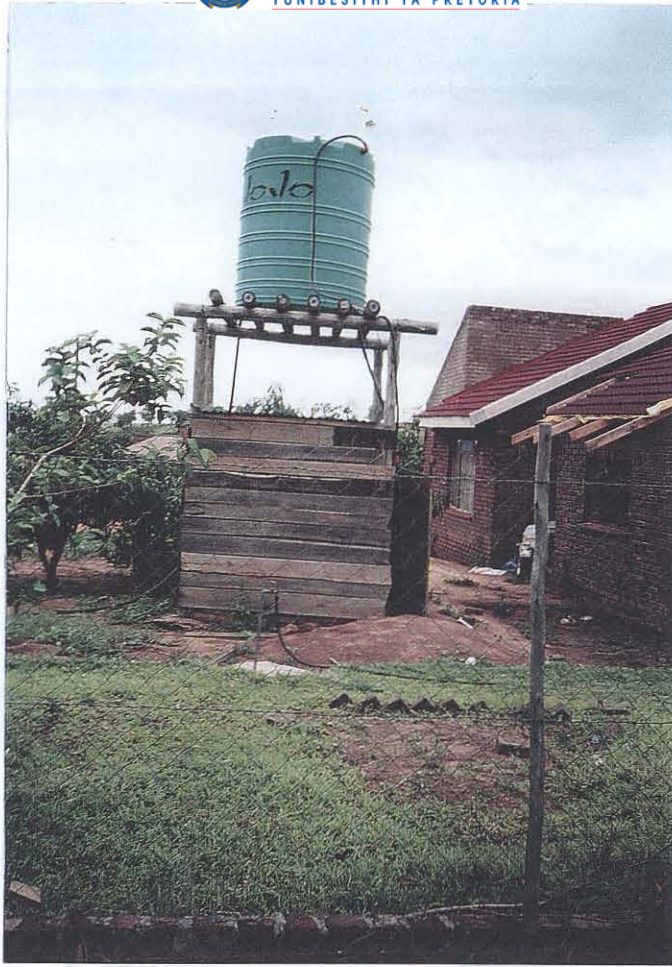


FIGURE A5

Woman taking three water containers home in a wheelbarrow



FIGURE A6



Water tank connected to a private connection by means of a hosepipe on a resident's stand in Makoko



FIGURE A7

Woman scooping water at a fountain in Makoko



FIGURE A8

Women washing clothes at the fountain in Makoko



FIGURE A9

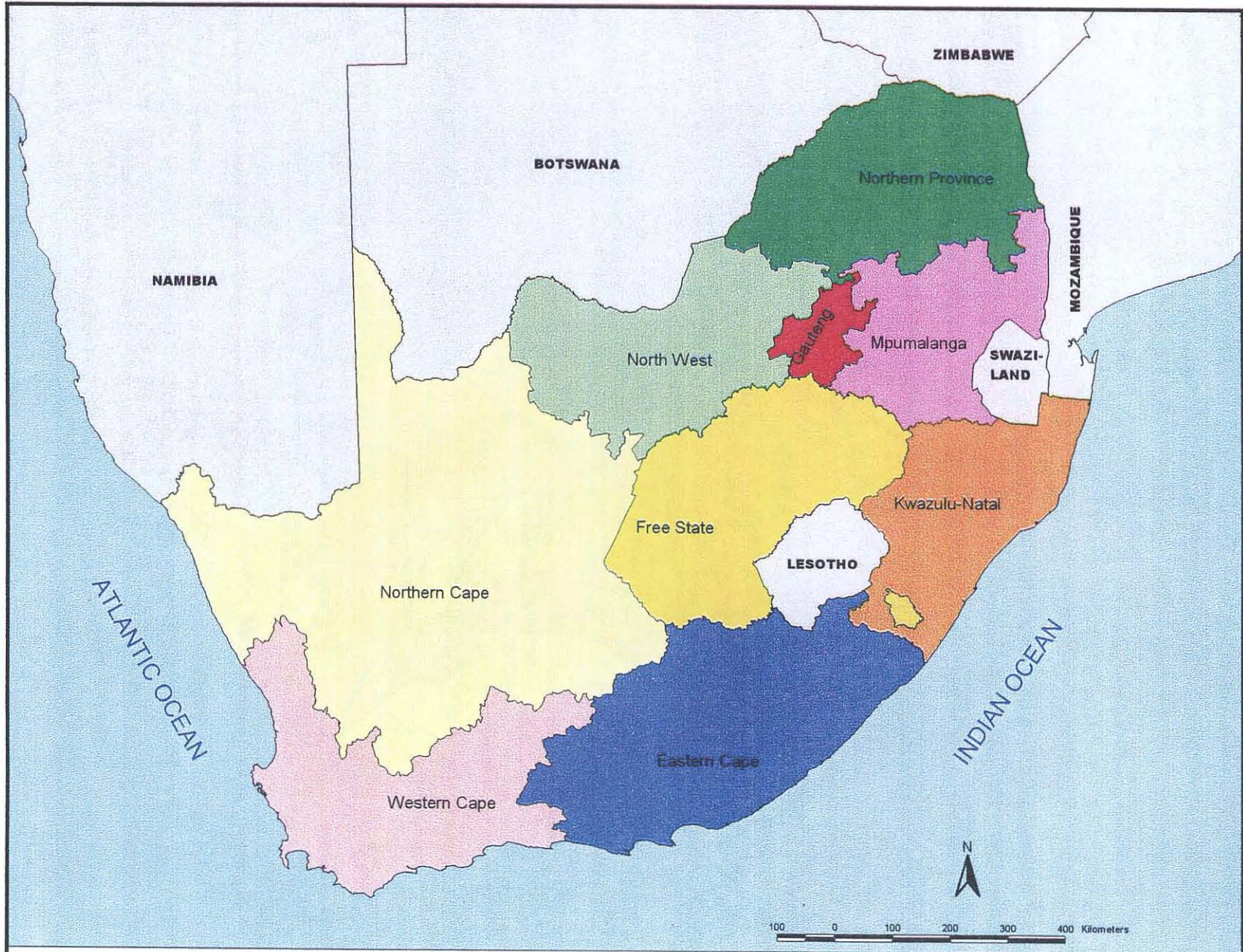
Woman working on her patch of land in the Sukumane Women's Club communal vegetable garden



FIGURE A10

Inyanga student (left front) in traditional dress

Map 1

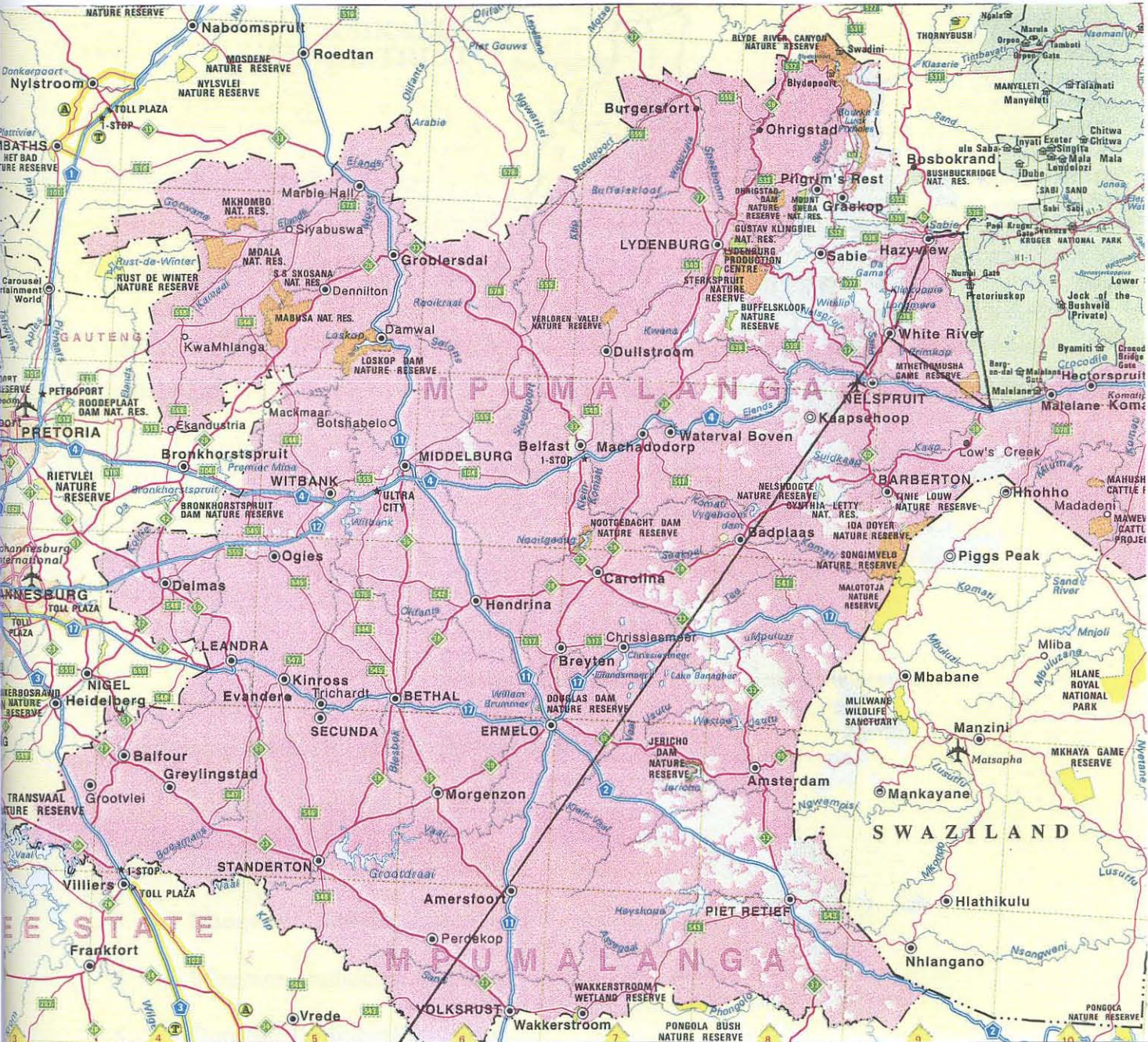


Neighbouring States

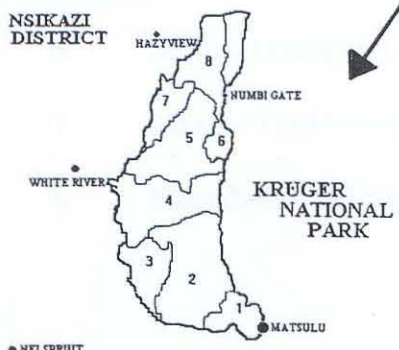
Compiler:	Moses Qotso
Date:	February 2000
Source:	DWAF
AVProject:	/data3/moses/S_Africa.apr
Projection:	Albers



Map 2 Province of Mpumalanga

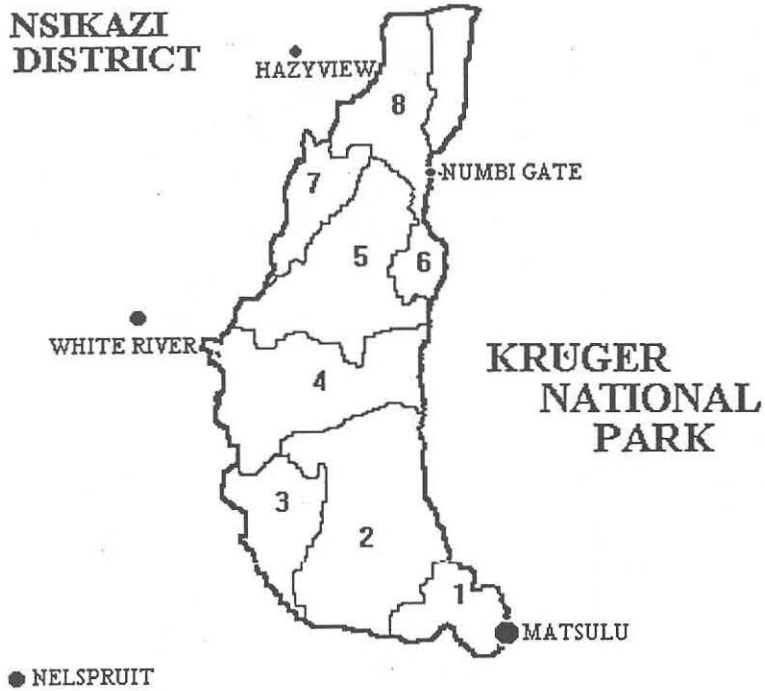


Source: Mpumalanga Tourism, Nelspruit, South Africa



Map 3

Nsikazi district in Mpumalanga



Source: Department of Constitutional Development

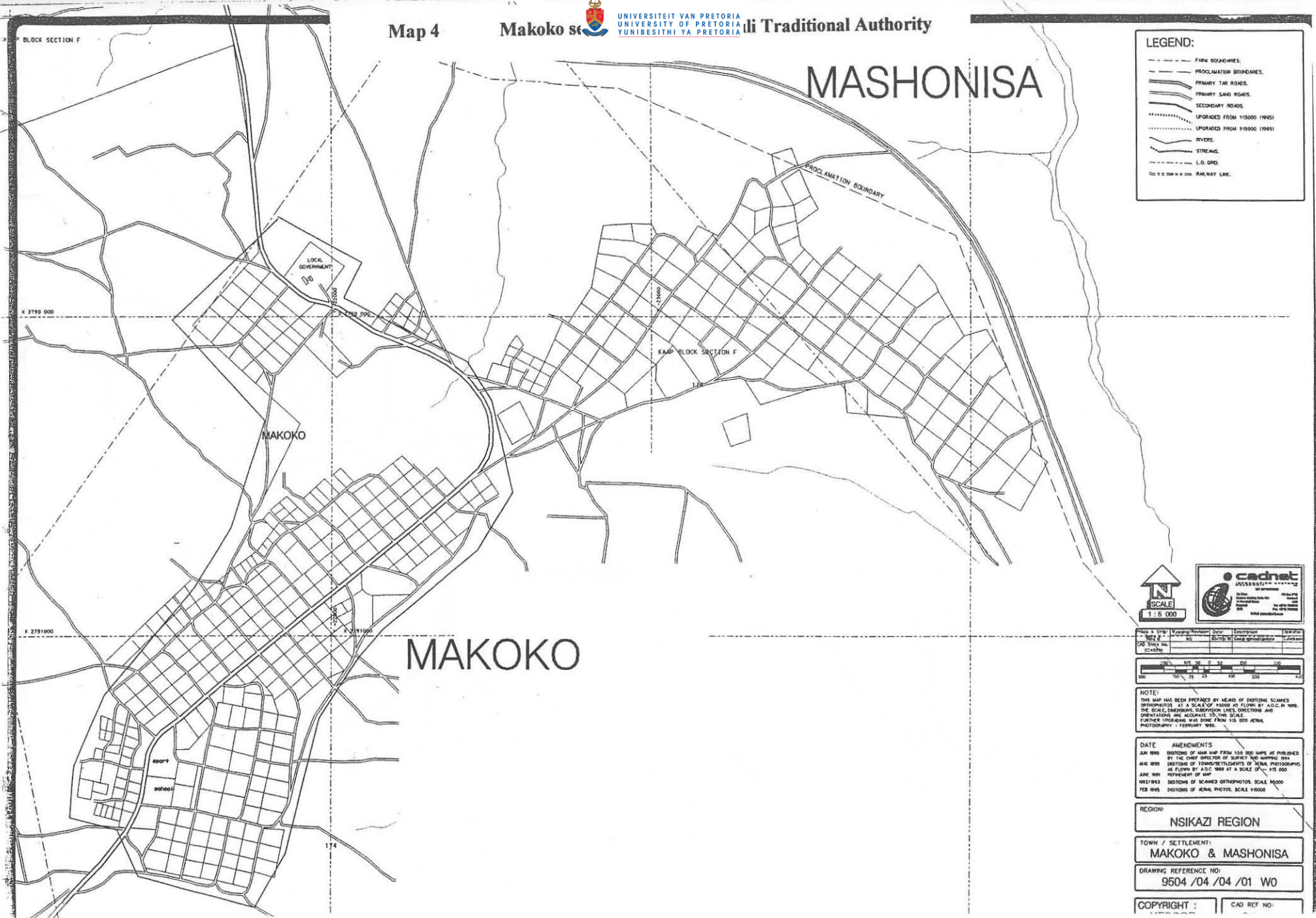
Traditional Authorities in the Nsikazi district

- 1 Lomshiyo Traditional Authority
- 2 Mpakeni Traditional Authority
- 3 Msogwaba Traditional Authority
- 4 Mbuyane Traditional Authority
- 5 Gutshwa Traditional Authority
- 6 Mdluli Traditional Authority
- 7 Masoyi Traditional Authority
- 8 Nkambeni Traditional Authority

MASHONISA

LEGEND:

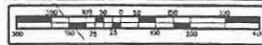
- FARM BOUNDARIES.
- PROCLAMATION BOUNDARIES.
- PRIMARY TAR ROADS.
- PRIMARY SAND ROADS.
- SECONDARY ROADS.
- UPDATED FROM 1:5000 (1995)
- UPDATED FROM 1:5000 (1995)
- RIVERS.
- STREAMS.
- L.O. DRG.
- RAILWAY LINE.




SCALE
1:5 000



Date	Author/Revision	Date	Description	Operator
2004/04/04	10	2004/04/04	Design approval	J. Anderson



NOTE:
THIS MAP HAS BEEN PREPARED BY MEANS OF DIGITIZED SCANNED ORTHOPHOTOS AT A SCALE OF 1:5000 AS FLOWN BY A.S.C.M. 1999. THE SCALE, ORIENTING, SUPERVISION LINES, DIRECTIONS AND ORIENTATIONS ARE ACCURATE TO THIS SCALE. FURTHER REVISIONS WERE DONE FROM 1:500 Aerial PHOTOGRAPHY - FEBRUARY 1995.

DATE AMENDMENTS

JAN 1999	DIGITIZING OF MAP FROM 1:5000 MAPS AS PROVIDED BY THE CHIEF DIRECTOR OF SURVEY AND MAPPING 1994
APR 1999	DIGITIZING OF TOWN/SETTLEMENTS OF AERIAL PHOTOGRAPHS AS FLOWN BY A.S.C.M. AT A SCALE OF 1:5000
JUNE 1999	REVISION OF MAP
NOV/1993	DIGITIZING OF SCANNED ORTHOPHOTOS SCALE 1:5000
FEB 1995	DIGITIZING OF AERIAL PHOTOS SCALE 1:5000

REGION:
NSIKAZI REGION

TOWN / SETTLEMENT:
MAKOKO & MASHONISA

DRAWING REFERENCE NO:
9504 /04 /04 /01 W0

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