

# Chapter 3: *Research design according to a four-phase model*



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A research design is... "*the complete strategy of attack on the central research problem*" (Leedy & Ormrod, 2001: 91).

### 3.1 INTRODUCTION

With reference to the above quote - a strategy can only be launched if the target is in full sight. The 'target' in this research study was nutritional problems as experienced by a rural community on a commercial farm. How this 'target' (as expressed in the research problem) came into sight was discussed in chapter one and how this 'target' was 'attacked' will be discussed in this chapter. The mandated mission of community development and PAR paradigm as discussed in Chapter 2 also guided the strategy of attack (research design). The research design was originally written in the form of a proposal, planned ahead of the execution of the study. This chapter, however, is a reflection on the proposal as it was designed and how it evolved into the executed research plan.

Reflecting on the research design then, the following is addressed in this writing:

- Research aim
- Four phase model
- Conceptualisation
- Study population and sample
- Methodology
- Delimitations.

It is clearly stated in the literature that interventions performed within communities should develop through incessant phases (Andrien, 1994; Dennill, King & Swanepoel, 2000:152; Endres, 1999:240; McKenzie & Smeltzer, 2001:23; Simpson-Hébert & Wood, 1998:6). The phases in this study are situation analysis (also called a needs assessment), design, implementation and evaluation. The activities in the various phases should not be rigidly demarcated into watertight compartments. This implies that both forward movement through successive phases, and a return to earlier phases may occur. The process itself usually starts with an initial contact and familiarisation stage, through which the research team conveyed their first collective action. The sequence within the process of research design should begin with a community with a particular need or problem and an investigation into the situation of that community. Through mobilisation and conscientisation, the situation should then be assessed and analysed.

The following two phases should be distinct but with interrelated dimensions and usually include designing the planned intervention and implementing the designed intervention. Knowledge obtained from the first phase should be used to translate the expressed needs and problems into connecting, developmentally focused hierarchies of needs, objectives, change strategies and outcomes, which constituted the planned intervention. Sequenced, incremental plans of action should be developed to respond to each of the needs, objectives, change strategies and outcomes. The research team should then invoke and use action strategies to implement the plans of action, and subsequently the planned intervention. These strategies usually include mobilising needed resources (human and material), implementing all aspects of the plans of action, and using feedback obtained from participants and other stakeholders.

Evaluation in a phase-approach is depicted as an activity interlinked with the other phases. Evaluations of all major decisions and actions taken during the needs assessment, design and implementation of the intervention are done on a regular, ongoing basis. Evaluation of the planned intervention outcomes and the determination of the planned impact on the identified problems and needs are also strong distinguishing features of the phase-approach. All the outcomes of formal and informal evaluations are fed back to the study or intervention to influence further planning and implementation.

The research aim and various objectives and outcomes will now be revealed.

### **3.2 RESEARCH AIM**

The overall research aim of this study was *to devise a model for nutritional interventions in rural areas*.

In order to fulfil this aim, baseline data from a selected community was obtained and analysed specifically with the intention to identify nutritional needs or problems and to address one of these needs and problems by implementing nutritional interventions. The other needs would be addressed by other researchers (post-graduate students).

The identified nutritional needs and problems were indicative of the content around which the design and implementation of relevant interventions would revolve. Evaluative research was also planned in terms of process and outcome to construct a generic model. This model was of significance to understand the relevant factors that should be considered to address nutritional

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problems in order to contribute to the improvement of health and nutritional status, specifically with reference to children younger than 10 years of age.

The **assumptions** that underscored this study were the actual presence of nutritional problems in the selected community; that these problems can be defined as needs; and thirdly that the community members would be willing and competent to be persuaded to address these needs. I also assumed that we (the research team) would be allowed entrance to the farm and that the people would be interested in our study and willing to participate.

Certain **limitations** and constraints were envisaged before the start-up of the study. The specific community had not been identified when the proposal of the study was written, but certain problems regarding *communication* were foreseen. The rural communities that we had in mind as target population are predominantly African, speaking any of the local languages. We knew that we would be using interpreters and risk the loss of deep rooted meanings and linguistic nuances. Other possible obstacles were foreseen to be *non-commitment* of certain community members. *Time* was also an issue, because community development and PAR approaches demand time investments. All the members of the research team were full-time employed and had only a certain number of hours available for research. *Logistics*, such as the distance to travel to the community was another problem, implying only well-planned, pre-scheduled visits.

### 3.2.1 Goals and objectives

The goals were set in terms of four phases that need to be conducted. Each goal (phase) consisted of various objectives, stated for the research team to execute during the course of the study and intervention.

#### 3.2.1.1 Phase 1: Situation analysis

- Explaining the overall aim of the research study to all involved stakeholders (e.g. farm owner, community members, other farm workers like managers, health and agricultural workers from local government)
- Getting consent and commitment from all involved stakeholders
- Describing the community in terms of
  - ⇒ demography
  - ⇒ socio-economic profile
  - ⇒ geography
  - ⇒ existing resources

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- ⇒ structures and services available
- Describing the nutritional situation in terms of
  - ⇒ nutritional status of female household members
  - ⇒ nutritional status of children
  - ⇒ household food security
  - ⇒ hygiene and sanitation practices of household members
- Identifying specific nutritional problems
- Assessing the various identified nutritional problems
- Executing further inquiry into the assessed nutritional problems
- Translating those problems into felt/real but addressable needs
- Identifying the most appropriate means and strategies for intervention
- Establishing a basis for the designing of a suitable intervention.

### **3.2.1.2 Phase 2: Design**

- Presenting the identified needs and problems to the household and community members to reflect local values and agreement
- Involving the household and community members in prioritising the identified needs and problems as far as possible
- Identifying a key informant in the community in agreement with the attending community members to assist with the implementation of the intervention
- Developing clearly conceived goals and objectives for the intervention in collaboration with the involved participants
- Designing the facilitation plan (strategies, messages, learning activities, resources and outcomes) for the intervention guided by the set goals and objectives
- Choosing the most appropriate programme format including procedures, methods, techniques and support material for implementing the facilitation plan
- Designing the evaluation plan in terms of process and outcome.

### **3.2.1.3 Phase 3: Implementation**

- Preparing of the team, participants and the ambience to enhance learning
- Conducting, coordinating and integrating the facilitation plan
- Revising by monitoring and giving feedback to the community
- Repeating and reinforcing the messages.

### 3.2.1.4 Phase 4: Evaluation

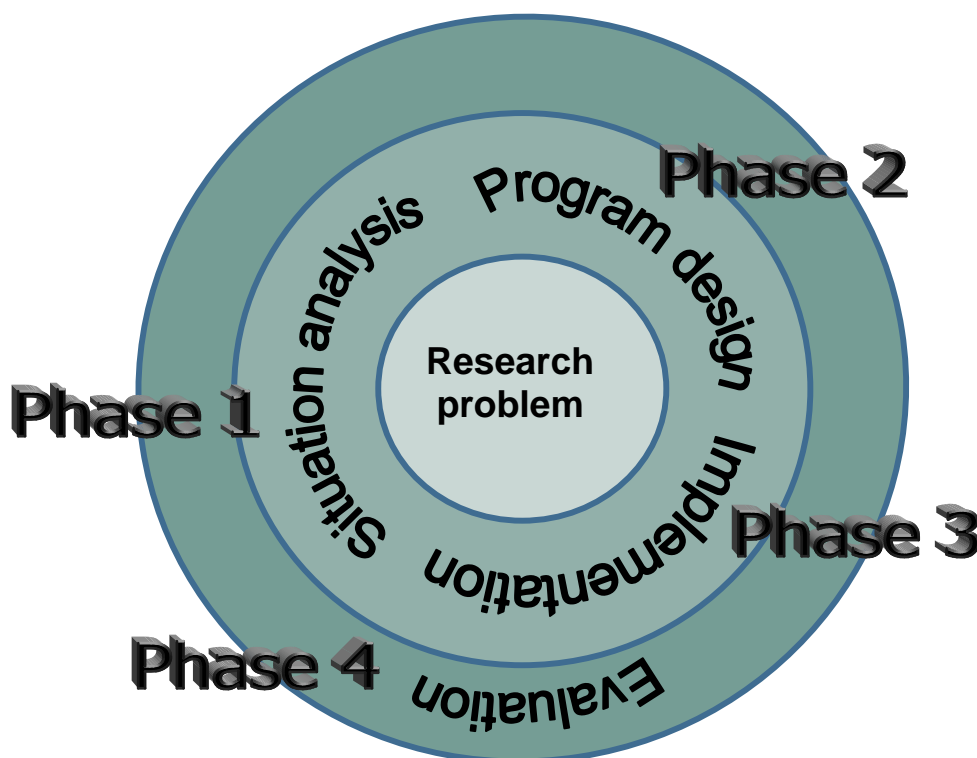
- Assessing the implementation of the interventions in terms of the pre-set goals and objectives (process evaluation)
- Determining the outcomes of the interventions as it occurred in the targeted commercial farms in terms of improvement of household food security (impact evaluation) (Impact evaluation will only be done on a limited scale, because some of the outcomes will only become evident after a longer period of implementation)
- Empowering household and community members (females specifically) as active participants in programme planning, implementation and evaluation
- Enabling household and community members to critically analyse their own particular situation and problems
- Establishing community ownership of the intervention.

### 3.2.2 Research outcomes

- A generic model for nutritional interventions on commercial farms
- A basic field of knowledge regarding household food security on commercial farms in South Africa, including academic knowledge and local knowledge (also referred to as traditional/insider wisdom and expertise)
- Improved household food security as experienced by adult female community members
- Socially meaningful research results (as experienced by the participants)
- A detailed dissemination report (as evaluated by the study leaders and external examiners)
- A set of educational material regarding identified needs for each household in the community
- Publications as a means to communicate research results to international and national health, economic development, and/or environmental policy-makers, academics and the public
- Community ownership of the intervention
- Support, mentoring and degree-based training of students from previously disadvantaged communities
- Capacity building through providing opportunities for interested scientists (local and foreign) for career development in the health, environment and social sciences, with specific reference to the methodological tools in use
- Strengthened capacity at community level through improved nutrition, better health, lower medical cost, improved learning abilities, productivity, and better quality of life.

### 3.3 FOUR-PHASE MODEL

Various models and approaches as cited in the literature were considered as parameter to guide the research design process (Allen & Gillespie, 2001; Andrien, 1994; Caffarella, 1994:18; Dennill *et al*, 2000; Endres, 1999). A particular model was constructed (see Figure 3.1), drawn from the vast array available, that fitted in with the values, preferences and belief systems of the research team as well as the approaches integrated into the research design of the study. The model was also integral to the research aim, namely to address specific nutritional needs and problems by implementing relevant, effective nutritional interventions. This four-phase model encompasses four interdependent but connecting sub-processes, namely: needs assessment (situation analysis), planning (programme design), implementation and evaluation. This model was considered comprehensive and practical to follow in order to address the research problem. It also gave a different, but more distinct meaning to the myriad of activities involved in planning this research study. At the same time it addressed the entire continuum of processes involved in developing valid and reliable interventions for rural communities. The model hence had a dual function by being used as reference for both constructing the research plan and the relevant intervention.



**FIGURE 3.1: FOUR-PHASE MODEL FOR RESEARCH DESIGN**

Underlying the model is the PAR paradigm, implying that participants were involved in collaborative needs identification, assessment and analysis as well as the design and implementation of interventions to respond to these needs. Participants were therefore involved

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in all four phases of the study. A distinguishing feature of this model is that it should not be used as a blue print or recipe, but as a reference. The knowledge produced should always be linked to the actual context of the study or the intervention. This reference model is also compatible with the deployment of a wide variety of research methods and techniques based on the particular situation.

All the activities included in the four-phase model are considered small steps in a long journey towards behavioural change, development and improving nutritional status. Although some activities will fail, these failures will provide lessons through reflection and analysis which make it possible to attempt the next step.

### 3.4 CONCEPTUALISATION

Knowles (1990:5) said: *“If you want to understand my thinking, you have to go along with my definitions”*. Language is contextual and therefore you have to adopt the word that is most meaningful to an event or activity within a particular context. Concepts integral to this research study all have specific contextual meaning – ‘nutritional’, ‘intervention’, ‘model’ and ‘rural communities’.

Although Participatory Action Research (PAR) swathed the research process of this study, the content part (as reflected in the title of the thesis) is grounded within the concept of ‘nutritional interventions’. The denotations of this concept are found within the broader discipline of ‘nutrition’, which is simplistically defined as: *“the science of foods and nutrients and other substances they contain, and of their actions within the body including ingestion, digestion, absorption, transport, metabolism and excretion”* (Whitney & Rolfes, 2002:2). According to this definition, nutrition as a science forms part of the natural sciences. To examine nutrition from a holistic point of view, it should also find a place in the social sciences. A broader definition would therefore include the social, economic, cultural, agricultural and psychological implications of nutritional behaviour. This study was concerned with these broader aspects of nutrition and therefore found a secure home within the social sciences.

At this stage it may be useful to differentiate between terms that are often used interchangeably in the field of interventional efforts. When is an action called an intervention, a project or a programme? What are promotions and how does it differ from interventions? Social interventions are defined as *“structured and more permanent social actions aimed at changing something in the social world for the better”* (Mouton, 1999:9). We intervene in



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a situation when we believe that the normal course of events has gone wrong, e.g. when certain forms of social services (health, care, sanitation) are perceived to be less than acceptable or declining. Interventions are also defined as “*sets of actions and decisions that are structured in such a way that their successful implementation would lead to clearly identifiable outcomes and benefits*” (Babbie & Mouton, 2001:88). McKenzie and Smeltzer (2001:8) refer to health interventions as “*systematically planned health promotion programmes*”. The term nutritional intervention, as used throughout this study, refers to all planned actions to address nutrition and nutrition-related problems and needs. It is thus used as an encompassing term including activities like education, promotion and communication. Preference is given to the term ‘nutritional’, instead of ‘nutrition’, because (in my opinion) it includes all other aspects related to nutrition such as water, hygiene, sanitation, food usage, and food gardening.

Connotations of ‘household food security’ were used in the construction of measuring instruments and semi-structured schedules. It also formed part of the methodology, content of the educational messages and support materials. It was envisaged during the designing phase of the research study that only certain aspects of food security would be addressed, depending on the assessed needs and particular situation in the community. Nevertheless, the concept of ‘household food security’ was used as the starting point from which all other aspects of this study departed.

A ‘model’ is defined in 13 different ways (Merriam-Webster, 2004). It can denote to a set of plans for a building, a structural design of a house, a miniature representation of something, a person who is displaying clothes, an analogy used to help visualise something that cannot be directly observed and a system presented as a mathematical description of an entity. In this study none of these definitions were directly reflected in the way that the term was used. “*An analogy used to help visualise something that cannot be directly observed*” is probably the most accurate description within the context of this study. As used in this study, it is synonymous to a framework, being a basic conceptual structure.

There are always differences between what people say and what they do, or within research projects, between the rhetoric and practice. Several unexamined concepts may be plugging the gap between rhetoric and practice (Nelson & Wright, 1995:14). One is the continued use of the word ‘community’, as if it covered a homogeneous, idyllic, unified population with which the researcher can interact without any problems. Too often homogeneity of interests is assumed, where an intervention, however participatory, will benefit some people while others lose out.

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'Community' is a concept often used by organisations, rather than the people themselves, and it carries connotations of consensus and needs determined within parameters set by outsiders. Shifts in power between community members who engage in participatory development processes need to be examined carefully and discussed with them.

'Rural communities' in this study, referred to people working and living on commercial farms. It included farm workers and their extended families, but excluded the farm owner, his family as well as any farm manager that was employed. In South Africa, these farm workers are usually black Africans. A commercial farm was defined as one where agricultural products were yielded on a large scale contributing directly to the economy of the country.

### 3.5 STUDY POPULATION AND SAMPLE

No intervention, whether initiated by outsiders or by the people themselves can hope to succeed unless it contains a strong element of human development and empowerment. Empowering women is also a key issue in achieving household food security (Adato & Feldman, 2001; Quisumbing & Meinzen-Dick, 2001; Quisumbing *et al*, 1995) and increasing women's education is a key ingredient for women's empowerment (King & Alderman, 2001). Women are also key agents of human development (Balit, 1999:4). They can improve the quality of life in rural communities by improving family nutrition, ensuring the use of safe drinking water and teaching their children good health practices. Investing in women's education increases women's capabilities, expands opportunities available to them and empowers them to exercise choices. There is also evidence that not only women, but also their families, their countries and the world by extension, will benefit in terms of improved food and nutrition security (Gittinger, 1991; Quisumbing & Meinzen-Dick, 2001). Women's education leads to lower fertility and child mortality and can thus be seen as the single most important policy instrument to increase agricultural productivity and reduce poverty. Women are generally responsible for food production and food preparation in developing countries. Interventions aimed at improving household food security should therefore target women.

I had a certain mindset and opinion when I approached the informants of the study. In the words of Kotze and Kotze (in Wetmore & Theron, 1998:39) – "*It is precisely those who have learnt to survive with virtually nothing at their disposal who possessed valuable knowledge*". This mindset was further strengthened by Burkey (2000:51), who wrote that many, although not all, poor people have a low opinion of themselves and of their ability to change their situation for the better. Because of this low opinion, and perhaps out of fear, the

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poor do not assert themselves. They remain shy, passive and withdrawn. Their dependency relationship with others, who are stronger, diminishes their self-confidence and initiative. If not oppressed by the more powerful, they are oppressed by their own limited knowledge and poverty. Their lack of knowledge and information prevents them from competing successfully for their fair share of resources and keeps them from effectively utilising the few resources that they do control. Although often aware of their limitations, they do not know how to acquire knowledge or gain access to information.

Against this background, the study population was chosen and the sample group approached.

The study population group was the members of a community living on a commercial farm, approximately 15 kilometres from the popular tourist town of Clarens in the North Eastern part of the Free State province of South Africa. This area was considered rural, because it is remote and lack basic facilities (municipal water, sewage and garbage removal systems). The farmer was seen as the gatekeeper for access to the households on the farm and thus also as 'access agent' to the sampling unit, the households. In order not to interfere with farm activities, we decided on the adult female community members from the various households as unit of analysis and spokespersons for the community. These females were further seen as informants on nutritional practices of household members and specifically the young child. Although stated and seen as 'research objects', these women were full participants in the research process, contributing to planning, implementation and evaluation of the intervention. The intervention as such was the object of study when the process of design and implementation were assessed to ensure successful outcomes. The unit of observation then, were the women seen as participants but ultimately owners of the intervention.

As mentioned previously, a striking and frightening statistic is that the most severely affected children live on commercial farms in South Africa. Collaboration with the farmer (owner of the commercial farm) was the only way to reach these children. Most of the farmers' wives are members of the South African Women's Agricultural Union (SAWAU). It was therefore obvious to approach this national women's organisation as a vehicle to reach the children. This organisation is very dynamic, has a track record of being influential in farming communities, is keen to participate and it has a current membership of approximately 13 000 members. Furthermore, a large number of the commercial farmers' wives, usually attend the biannual regional conferences. During the national and regional conferences, the president of the SAWAU called on the members to participate in the project.

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A particular member was interested to participate in the study. We visited their farm and started with the negotiating process. We, however, experienced certain logistical problems but the specific women referred us to another possible farm. We negotiated access to that farm via family relations and other convenience matters. This particular farm was consequently selected because the village was accessible and reachable. The workers on the farm are from the Southern Sotho ethnic group, speaking the local traditional language.

The young child (birth to 10 years) living on the farm was the target group of this study, although the actual informants were female household community members. The research team also included other individual members of the households as informants, mainly to better understand the living conditions and environmental factors influencing the child. Other key-informants that were used as data sources included the previous and current owners of the farm, staff involved in rendering local health services and the teachers from the local farm school.

All adult women living on the farm were invited to participate as informants in the study. The following criteria, however, did apply namely that they should be:

- older than 18 years of age
- a permanent resident of the household and the community/farm
- familiar with the community and the surrounding areas
- interested in food and nutrition.

Although the sample was purposeful, it can also be considered a theoretical sample. The study, as it progressed, set down criteria and informed me on which information to collect next and where to find it (as advised by Babbie and Mouton, 2001:287).

### **3.6 METHODOLOGY**

Within the PAR paradigm, one should be very 'open-minded' about what is considered data. Reason (1994:334) states that data can include a whole range of expressions (including songs, dances, sound clips, graphic images) as well as the more orthodox forms (written text obtained from interviews and observations). Involving participants mainly produce data, because local information is considered to be more relevant than aggregated data. It includes descriptive records as well as records of each participant's experience, including judgments, reactions and impressions of what is going on (Babbie & Mouton, 2001:326; Coffey & Atkinson, 1996:5).

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A methodologically driven view of PAR finds itself submerged in different research methods and techniques from various qualitative and quantitative origins. There are actually an unlimited variety of data-gathering techniques suitable for use in PAR (Babbie & Mouton, 2001: 325; Fals-Borda, 1988). A PAR project mobilises theories, methods and information from whatever source the participants jointly believe to be relevant to reach the research objectives (Greenwood *et al*, 1993:178). Such an eclectic model implies that research approaches can be tailored to each specific situation and structured differently in different settings.

One of the basic tools of PAR is dialogue. Dialogue requires participation and is action-orientated. The aim is not to substantiate like conventional tools, but to sensitise; not to explain but to conscientise and learn; and not to plan but to strategise a process based on a continuous cycle of analysis-action-reflection (Burkey, 2000). In PAR, group interviews are commonly employed. These are also referring to as dialogue sessions. Through dialogue, participants are helped to develop knowledge by learning from their own reality and specifically by learning to critically analyse their own particular situations and problems. Dialogue ensures that participants and researchers are searching together for possible solutions. The respondents in this study were illiterate. We could therefore not ask them to keep any records themselves. The data, however, was still mainly verbal in nature. Individual interviews were recorded in writing by the researcher and fieldworker. Field notes represented information obtained from observations; recorded group discussions were transcribed; transcripts represented data from household trials and dialogue sessions; the household food security scale and other assessments were also done in writing.

The research design, as based on the four-phase model, with its aim and various objectives and outcomes was integrated into a methodological framework (see Figure 3.2), which served as a reference model throughout the research project and intervention process.

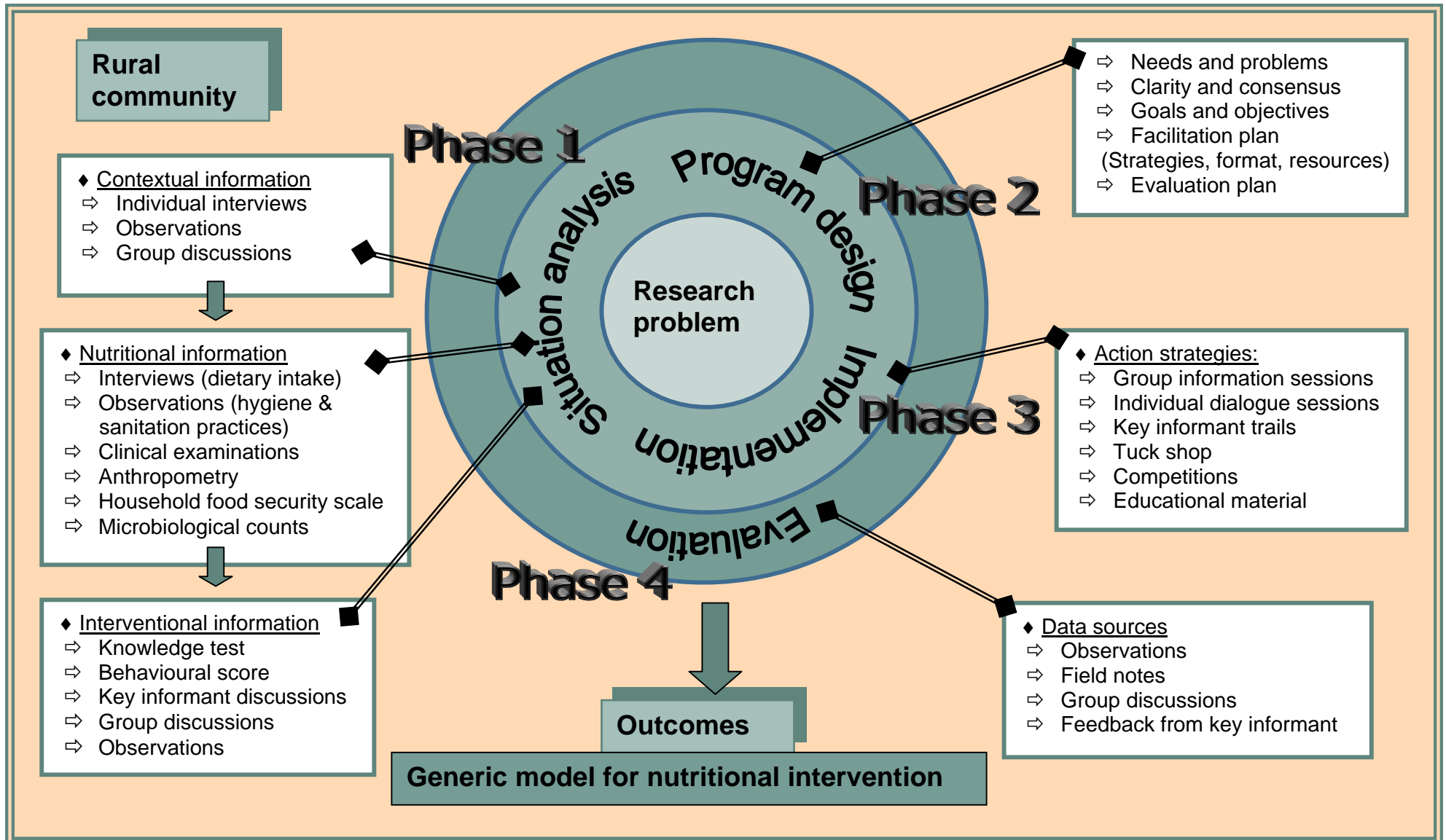


FIGURE 3.2: METHODOLOGICAL FRAMEWORK FOR THE STUDY

The methods and techniques used in this study are now described in terms of each of the four phases.

### 3.6.1 Phase 1: Situation analysis

*“Many programs conduct a baseline survey before beginning program activities so that changes in the prevalence of attitudes and practices can be measured in order to evaluate program effectiveness”* (Dicken, Griffiths & Piwoz, 1997:1.2).

The first phase of the study is considered an empirical study with a primary data design, because baseline data was collected. Phase 1 is also considered descriptive with an aim to provide information for needs assessment. A qualitative approach was used referring to the natural setting in which the situation analysis (needs assessment) was conducted. The views of the community inhabitants on the importance and contents of an intervention beneficial to their community were considered vital. There was also a concern to define and specify the needs and problems in such a way that it would assist the design of appropriate interventions. The needs and problems of the community were described in detail and length, in order to capture the sense of their views. This was, however, very idealistic, bearing in mind the language, cultural and race differences that existed between the participants and certain members of the research team. An attempt to overcome these barriers was to use a key informant from the community and a field worker familiar with the area and the local language.

The first phase of the study was done on three levels. These are described in full detail in chapter 6, but will for clarity reasons also be mentioned here. Level one was also considered the contact-making phase, through which contextual information was obtained. Level two was an investigation into the nutritional situation. On level three, information specifically relevant to the proposed intervention was obtained.

#### **Contact making**

Phase one started with the researcher's entrance into the area. Swanepoel and De Beer (1997:71) said that the secret to success at this phase is to be as unobtrusive and as natural as possible. We wanted to get acquainted with the people, to display empathy with and interest in the people's situation. The contact-making phase had three main goals, namely:

- for the people to know and accept the research team for what they are and has come to do
- to earn acceptance from the people

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- to know the people and their circumstances
- for the people and the community to identify and describe their needs and problems.

Contact making, however, could not be rushed. The community members had to accept the research team's bona fides before the study and the intervention could commence. The researcher attempted this through informal talks, friendliness, a keen interest in the people and their circumstances and by just being present.

The following data-collecting methods were used during the contact-making phase of this study, namely individual informal interviews, observations, and group discussions. Because the research team was interested in understanding and describing the situation of the community, this phase can also be described as contextual in nature. Ideographic research strategies attained preference, with no intention to generalise findings to a larger population.

***Individual, informal interviews*** were conducted mainly because of the low literacy level of the study population. Data was obtained during household visits and included collaborative efforts of the research team. Written and voice recordings were made.

Direct, simple ***observation*** was also done in this study, supplemented by extensive field notes. A structured observation schedule was designed, pre-tested and used to gather information regarding the following aspects:

- Social structures and resources in the community
- Household structure and resources
- General hygienic practices of household members
- Cleanliness of clothes, washing water, and hands
- Methods and ways of food transport and supply
- Food production (if applicable)
- Food purchasing (where, what, how much)
- Storage before and after preparation
- Food preparation and serving
- Environment in which the respondents live
- Environmental safety aspects like the presence of rodents and insects in the food preparation area.

The schedule was based on the literature (FAO, 1997: 56-69; Latham, 1997: 15-21). Four dimensions with different indicators were identified as being part of the concept of household



food security. The indicators were used to verify that relevant aspects of household food security are covered during data capturing. Recordings of empirical observations as well as the team member's possible interpretation of it therefore also formed part of the observation technique.

A ***group interview technique*** was employed as a summative activity, but also to elaborate on the purpose of the study and further planning. This technique was chosen from the normal repertoire of qualitative research, because it encouraged the involvement of participants and provided the opportunity for the researcher to investigate further and deeper into the phenomena under study (Babbie & Mouton, 2001:292).

### **Nutrition situation**

The nutrition situation within the community was determined in terms of the children's *nutritional and health status, household food security as well as hygiene and sanitation practices of caretakers and other community members*. These indicators are well accepted within the study field of community nutrition (Endres, 1999; FAO, 1997; Latham, 1997:9). Individual interviews and observations were once again deployed as research techniques, with caretakers being the main information source. The nutritional status of the target group was determined in terms of dietary patterns, clinical examinations and anthropometrical indicators.

An ***interview schedule*** was used as guidance to investigate dietary patterns. The following aspects were included:

- Habitual food intake
- Food production and availability
- Food practices (preparation, preferences, distribution, serving, storage)
- Food preservation.

Probing regarding health status was also included in the interview schedule. The probes revolved around deaths and diseases within the community, availability of growth charts and breastfeeding practices. The available growth charts of the children were also assessed for birth weight, growth patterns and major health problems. The nursing sister of the visiting mobile health clinic was also interviewed regarding vital statistics of the district. Basic clinical examinations were also done whereby the children were screened for any prominent physical signs and symptoms of nutritional deficiencies. A framework, as proposed by Charney and Malone (2004: 42-44; 54-60) and Latham (1997: 209-210), was used to guide this activity.

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Household members were asked about their perception of *food insecurity*, using an assessment scale. This scale was originally constructed by Kendall, Ohlson & Frongilla (1995), adapted and previously used in the National Food Consumption Survey (Labadarios, 2000) (see Addendum A). The tool is described as a sound national measure for food insecurity and hunger and appropriate for standard, consistent use on national and local levels. The scale composed eight questions that investigate whether adults and/or children in the household are affected by food insecurity, food shortages, perceived insufficiency or altered food intake due to constraints on resources. Answers on each of the eight questions were scored, then summed and converted to percentage. The scale has further shown to be a stable, robust and reliable measurement tool. This scale was tested for usability in the particular community.

***Anthropometrical indicators*** are considered highly sensitive to food and nutrition insecurity and relatively low in cost to construct (Khan & Riely, 1995: 63-68). Anthropometry was therefore done - specifically weight and height measurements and head circumferences of all children under 10 years of age living in the community as well as those attending the local farm school. These measurements were used to reflect the adequacy of food intake, growth and overall health and welfare. Weight-for-age (w-a), height-for-age (h-a), and weight-for-height (w-h) indices were used to evaluate the extent and magnitude of malnutrition in the group of young children. These indices were expressed in terms of percentiles, which is the rank position of an individual on a given reference distribution, stated in terms of what percentage of the group is equated or exceeded by the individual (Lee & Nieman, 2003:172). International reference data, developed by the US Centres for Disease Control and Prevention (CDC), were used.

***Hygiene and sanitation practices*** were uncovered mainly by observations. These observations were quantified using three dimensions of personal, household and environmental hygiene. Indicators relevant to each of these dimensions were compiled from the literature (Ahmed *et al*, s.a; Almedon, Blumenthal & Manderson, 1997; Billig, Bendahmane & Swindale, 1999; Curtis, Cairncross & Yonli, 2000; Daniels *et al*, 1990). A score was attached to each indicator. A maximum of ten marks could be scored within each category, revealing excellent hygienic practices. More than eight marks were considered to be very good and between five and seven as good. A score of three or four were indicative of poor hygienic practices and less than three as very bad. Hygienic conditions were also determined using total microbiological counts on Rodac plates on various surfaces in the households, including mugs, plates, dining room tables, toilet seats, kitchen cloths, hands, clothes and food preparation bowls. The scoring procedure will be revealed in more detail in Chapter 6.

### **Interventional information**

The group's knowledge and behaviour regarding hygiene and sanitation issues were assessed, based on items identified from the literature. Key informant and group discussions followed these testings. Another observation technique was employed on a separate, unannounced occasion, whereby the fieldworker did friendly, informal household visits. She was instructed to observe the hygiene and sanitation practices of all the households without recording anything directly on paper. Recordings only took place after each visit.

This specific phase is discussed in Chapter 6.

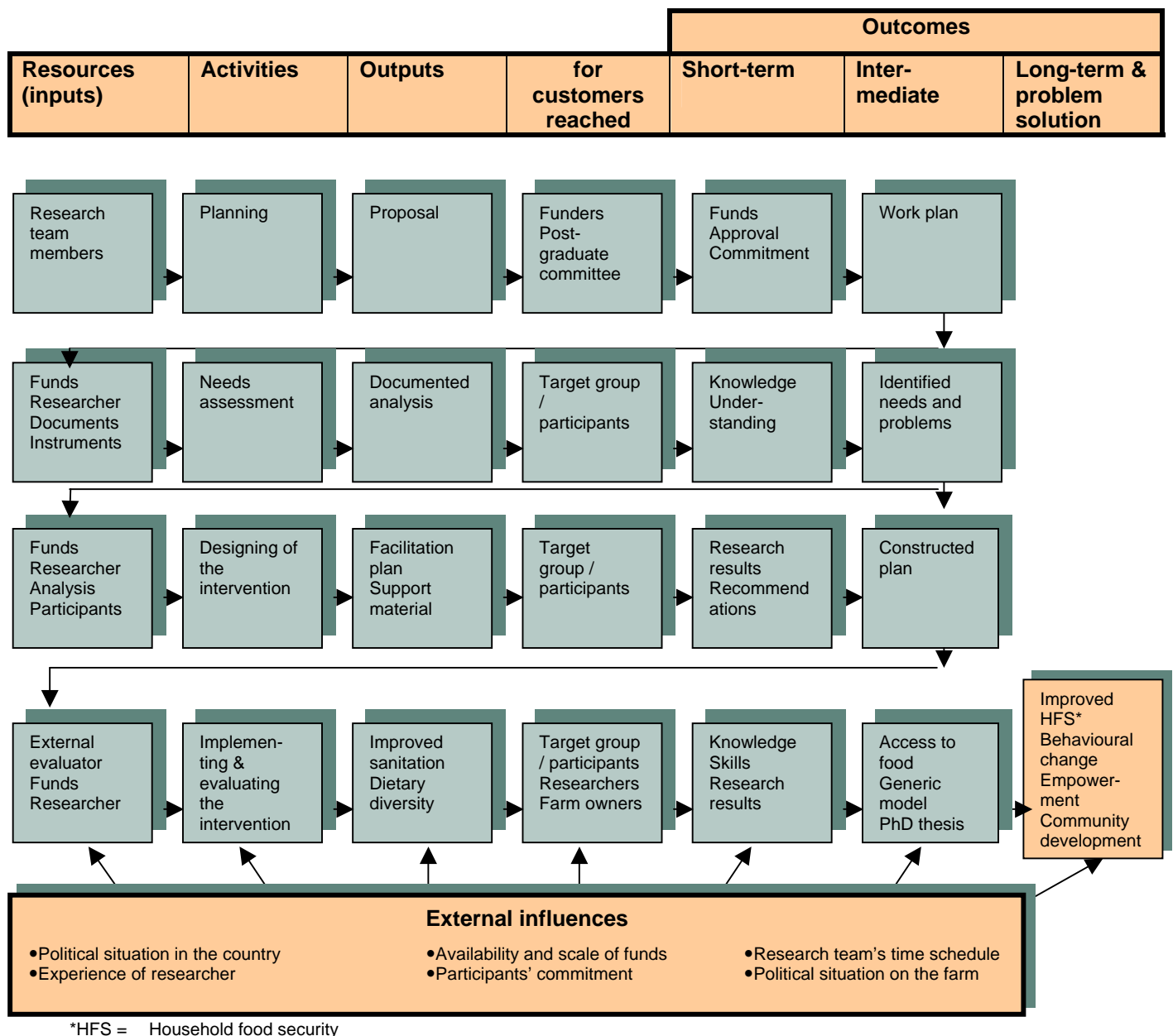
### **3.6.2 Phase 2: Design**

*“No single intervention or mix of interventions should ever be prescribed in isolation from a participatory process of problem assessment, causal and capacity analysis and program design”* (Allen & Gillespie, 2001).

The design of the nutritional intervention was based on the outcomes of the situation analysis (needs assessment). This design phase had a given starting point by being needs-based and participatory-action orientated. The focus of this phase was on tailoring the needs and problems of the community and constructing it into relevant, effective, appropriate community-based, nutritional activities to improve the household food security status of the community. This tailoring process was done in writing based on the 'logic model' of McLaughlin and Jordan (1999) as work breakdown structures of the study (see Figure 3.3). This figure depicted the sequence of activities that were necessary to execute the study. The people responsible for carrying out all these activities were primarily members of the research team, who were post graduate students enrolled at the University of Pretoria and their various project leaders within the Department of Consumer Science.

An effective designing process begins with clarity and consensus on its purposes, its scope, and the circumstances in which it functions well (Allen & Gillespie, 2001). During group discussions, consensus was reached regarding these issues. Other objectives of the designing phase were to develop clearly conceived goals and objectives for the intervention, to set up an action plan for the intervention guided by the set goals and objectives and to choose the most appropriate means and strategies for the intervention.

It was foreseen at the time when the research proposal was written, that the programmes would include small-scale agriculture production (vegetable gardens, possibly also fruit trees and livestock), food and nutrition education (processing and storage of food surpluses, food safety) as well as personal food hygiene, natural resource management, and income generation from food surpluses. Each programme would be the focus of a series of discussions with a key informant from the community, designed to learn from the community itself.



**FIGURE 3.3: WORK BREAKDOWN STRUCTURE OF THE STUDY**

### 3.6.3 Phase 3: Implementation

This study had a flexible and open design approach in the implementation phase, with eminence to the elements and principles of PAR (Whyte, 1995:290). This phase was considered

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the 'action' moment of PAR in which the action is deliberate, strategic, happening in reality and not as an experiment. Implementation was done by means of the following action strategies:

- Group information sessions
- Key informant trials
- Individual dialogue sessions
- Tuck shop
- Competitions
- Training sessions
- Home vegetable gardening
- Educational material.

Each of these strategies is discussed in detail in Chapter 7.

#### 3.6.4 Phase 4: Evaluation

*“Whether an evaluation is complex or simple, it should be rigorous in relating evaluation design to decisions”* (Allen & Gillespie, 2001:69).

The research design applicable in this phase was dual in nature. Process evaluation was done, using a naturalistic evaluative research design, with the purpose of generating knowledge (qualitative approach) and to make certain judgments. This knowledge was particularly used to develop a generic model and to inductively construct theory. A limited-impact evaluation was also done within a quantitative paradigm, using certain scoring systems. The items in the scoring instrument were derived from the literature (Almedom *et al*, 1997; Rietbergen-McCracken *et al*, 1998:120).

The changes in certain conditions like nutritional status, natural environmental awareness, health care, childcare knowledge as well as impact assessment (regarding social and environmental impact on the targeted rural communities) were monitored. Capacity building was measured in terms of the number of completed post-graduate studies made. A tract record of involved scientists was kept to oversee career developments made. Capacity at community level was measured in terms of improved nutritional status (recording anthropometrical measurements of children), following health statistics from the visiting mobile clinics on an ongoing basis, tracking school attendance and job performance of members. Community ownership of the project should be measured by monitoring it over an extended period of time.

This part of evaluative research was administered as an empirical study, using mainly primary data with a hybrid mixture of numerical and textual data and a medium degree of control and

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structure (Mouton, 2001:160). More specialised design types applicable were a quasi-experimental outcome design (as it presents the changes in certain social conditions like nutritional status, care, knowledge) and impact assessment (regarding social and environmental impact on the targeted rural communities). A reflexive control design was also distinguished because the target group who 'received' the intervention was compared with themselves before, during and after the intervention (Rossi *et al*, 1999:258).

The sources for data collection that were used to answer evaluation questions relevant to this needs-based, community-driven nutritional intervention were:

- Observations with field notes
- Group discussions
- Key informant feedback.

Originally the thought was to recruit and train some members of the community and the owner of the farm to keep a tract record of the intervention implemented on the farm. These records would have included notes on whether the intervention had been properly implemented, whether the target group had been adequately covered and whether the intervention was implemented as originally designed. Circumstances demanded another route. The principle researcher had to make unstructured observations and keep extensive field notes to assess whether the interventions had been well conceptualised and properly implemented. Notes specifically dealt with:

- Participant learning
- Programme structure (format, content, instructional method)
- Perceptions on programme outcomes (changes in people's knowledge, skills and behaviour)
- Planning process
- Impact on the individual households
- Impact on the community.

These notes also included information regarding possible codes and categories for data analysis, indications of process, incidents and illustrations of ideas.

In the true spirit of PAR, all stakeholders were asked to collaborate in the evaluation process using focus group discussions as technique. A focus group was defined as "*a carefully planned discussion designed to obtain perceptions in a defined area of interest in a permissive, non-threatening environment*" (Kreuger, 1988 in Lewis, 1995). This technique was chosen from the normal repertoire of the qualitative research, because it encouraged the

involvement of participants and provided the opportunity for the researcher to investigate further and deeper into the phenomena under study.

The number of participants usually depends on the objectives of the discussions. Smaller groups are preferable when the participants have a great deal to share about the topic or have had intense experiences related to the topic of discussion (Kreuger, 1988 in Lewis, 1995). For the purpose of this study, the aim of the discussions was to get as much participation from the community as possible. It would therefore be essential for all the participants to also take part in the group discussions. This all-inclusive group would represent the members of the community and all members of the research team. An interview guide, based on certain formulated evaluation questions, provided direction to the discussions. The outcome of the focus groups was to reach consensus on the 'success' and outcomes of the intervention.

The evaluative report (see Chapter 8) further included information on anthropometry (weight and height measurements, head circumferences) of all children under the 10 years of age and dietary intakes of households (with the focus on micronutrient intake). These intakes were compared with well-accepted standards such as the DRI's and RDA's. Size and number of vegetable gardens established, yields that were obtained from the gardens, the use of correct cultivation methods, and knowledge of vegetable production were also recorded.

### 3.7 DELIMITATIONS

*“A single project, no matter how well designed and executed, can seldom result in a cure for long-term problems experienced by a community. Developing culturally appropriate health education materials and processes is important for improving health in a community, but health education cannot alone cure social injustice or health disparities”* (Arcury, 2000:47).

The study was restricted to only one farm with a small number of inhabitants who formed the target population. The delimitations of the study were set in terms of a particular cultural group and a particular geographical area. The intention was not to generalise to larger populations but to learn from the experience. The study was therefore designed to be a learning process. All lessons learned from this process would be incorporated into a generic model for nutritional interventions in rural communities on commercial farms. This model was in the form of a visual presentation and included recommendations on how to assess nutritional needs on commercial

farms and to intervene accordingly. The users of this model are anticipated to be academic scholars and researchers.

### **3.8 CONCLUSION**

The four-phase model referred to in this chapter (Figure 3.1) had the dual function of being used as reference for constructing the research plan as well as the relevant nutritional intervention. This study invested in the well-being of rural women specifically because of the belief that to empower women is the key issue in achieving food security in households, families, communities and nations. Research methods and techniques were chosen to fit in with the PAR paradigm followed in this study and were indicated in terms of the various four phases. One particular outcome of this study was to construct a generic model for nutritional intervention on in rural communities on commercial farms. This generic model included outcomes of the evaluation phase, the expertise of external evaluators as well as recommendations by stakeholders and other members of the research team. Ways and methods used to maximise the quality of the research process as well as the research results were applied throughout the study. These are discussed next in Chapter 4.