

**Small-scale farming, marketing and organisational support received
since 2002 on the Mooi River irrigation scheme in Muden,
Central KwaZulu-Natal**

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**Submitted in partial fulfilment of the requirements
for the degree of**

Master in Social Science (Community Resources)

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Pietermaritzburg**

January 2007

ABSTRACT

Small-scale farming plays a significant role in rural people's lives. Small-scale farming contributes to food production, household income and to the employment of people in rural South Africa. They also face many constraints in their farming activities such as lack of capital, of quality seed, of fertilizer, of equipment, of water for irrigation, of technology, of storage facilities, of transport, of market, of training and finance. These in fact, limit farmers in their farming activities and affect their farming outputs.

In this regard, small-scale farmers rely on government, private companies and NGOs for agricultural support. These are often insufficient as farmers still face many challenges in their farming and their needs tend not to change for the better.

This study investigated whether there had been changes or improvements in small-scale farming on the Mooi River irrigation scheme in Muden over the past three years since the previous baseline survey was conducted in 2002. The study also investigated the activities of farmers' associations, Provincial Department of Agriculture and Environmental Affairs (DAEA) and NGOs in Muden and determined the activities that were needed for small-scale farmers to overcome their constraints.

The research took place amongst small-scale farmers from block 6, 12 and 15 that were randomly selected from 15 blocks on Mooi River irrigation scheme in 2002. Convenience sampling of individuals was done resulting in an estimated 25 percent sample of the farmer population. A household survey was conducted with each participant to provide data on demographic detail. Aspects of the sustainable livelihood analysis data tool were used to guide this data collection and to encourage the farmers to identify their assets in terms of people in households, age, education level, skills, contribution to farming and off-farm income. Focus group discussions were also conducted with each selected block, guided by sustainable livelihoods analysis in order for the farmers to identify their assets, institutions as well as constraints; and strategies to improve their small-scale farming.

The findings of this study showed that since 2002 the farmers' household size decreased which resulted in decreased family labour. In addition, the findings reflected that few young people were involved in farming. The level of illiteracy was still high among small-scale farmers and the few off-farm income-earning activities for farmers did not change for the better. Furthermore, off-farm income and farmers' markets to sell fresh produce decreased. The farmers had more skills and acquired more tools for farming. But accessing modern tools such as a tractor, bakkie, and water pump were still a challenge for the farmers. The findings showed that the farmers on the Mooi River irrigation scheme obtained support from farmers' associations, NGOs, and Provincial Department of Agriculture and Environmental Affairs which assisted them in their farming activities. Though the farmers obtained some support from the above-mentioned institutions, their farming constraints still persisted. As a result, the farmers made plans of action to minimize their constraints and improve their farming. The farmers planned to obtain fencing, undergo leadership training, use farmers' association constitutions, obtain a tractor, find markets, attend agricultural meetings, and obtain more dams, sprinklers and water pumps.

This study recommends that young people be encouraged to be involved in farming through the introduction of cash crops. The study also recommends that farming be made more attractive to young people as they are stronger and more educated than their parents. In addition, it was recommended that adult education and farmers' training be introduced because there is high level of illiteracy. There was a need for job creation for farmers to be able to earn incomes to support their farming. Market opportunities, promoting credit facilities, and promoting modern technology were recommended to improve small-scale farming on the Mooi River irrigation scheme.

ACRONYMS AND ABBREVIATIONS

ARD	Agricultural Research for Development
ARDC	Agriculture and Rural Development Corporation
AVRDC	Asian Vegetable Research and Development Center
DBSA	Development Bank of South Africa
DFID	Department for International Development
DAEA	Provincial Department of Agriculture and Environmental Affairs
EFO	Ezemvelo Farmers Organisation
FAO	Food and Agriculture Organization
FARM	Food and Agricultural Research Management
FSG	Farmer Support Group
FYF	Find Your Feet
GFAR	Global Forum on Agricultural Research
IDS	Institute of Development Studies
IFPRI	International Food Policy Research Institute
IISD	International Institute for Sustainable Development
IFAP	International Federation of Agricultural Producers
ITDG	International Technology Development Group
LFCU	Likwama Farmers' Cooperative Union
NDA	National Department of Agriculture
NGO	Non-Government Organization
PCD	People Centred Development
PLA	Participatory Learning and Action
CEAD	Centre for Environment and Development
SLA	Sustainable Livelihood Analysis
SD	Sustainable Development Department
UNDP	United Nations Development Programme

DECLARATION

I hereby declare that the research in this thesis is my own work. Where use was made of the work of others, this has been duly acknowledged in the text.

SIGNED:  _____

DATE: 23-02-2007

I Nyiraneza

ACKNOWLEDGEMENTS

Acknowledgement is gratefully expressed for the assistance and cooperation of the following people with the help of whom this work was made possible.

Prof J M Green	My research Supervisor, for her knowledge, support, patience and flexibility during this research
Sboniso Dlodla	Extension officer for block 15
Dudu Zulu	Extension officer for block 6 and 12
Mc William Mabaso and Philani Ndlovu	Translating in the field and translation of data instrument from English into Zulu
Small-scale farmers in block 6, 12 and 15	Cooperation and patience in the on the Mooi River Irrigation scheme research
University of KwaZulu-Natal	Fee remission for course work
Friends and Family	For love, prayers and encouragement
And God almighty	Strength and good health during this research

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CHAPTER 1

THE PROBLEM AND ITS SETTING

1.1 Importance of the study

Small-scale farming plays an important role in a household, in a community and in a nation as a whole. In Sub-Saharan Africa, 80 percent of the population lives in rural areas and 70 percent of this rural population is dependent on food production through small-scale-farming or livestock keeping for most of their livelihood (ITDG 2005a). As AfricaBio (2004) stated, 80 percent of food production in Africa is in the hands of small-scale farmers, most of whom are women who farm on small plots.

Apart from contributing to food production, small-scale farming also contributes to the employment for 60 percent of working people in Africa (ITDG 2005a; Chancellor, undated). For example, a rural survey conducted in the former homelands in South Africa in 1997, shows that 60 percent of income-earning people in Eastern Cape were small-scale farmers (Orkin and Njobe 2000).

In South Africa, small-scale farming forms a small but important role in the fight against poverty for households in the former homeland areas, and acts as a cushion for the poorest (Anon 2005). Households that are involved in small-scale farming have better nutritional status than households that are not involved in that sector (Anon 2005). Clearly, the performance of small-scale farmers is often crucial to the performance of the economy and a key factor in the potential for rural development and the alleviation of poverty (Chancellor undated). Thus, promoting the improvement of small-scale agriculture could be an effective strategy to reduce rural poverty and income inequality (Anon 2005).

Although the small-scale farming sector plays a significant role in people's lives generally, it faces many constraints and these impact on the production outputs. Lack of capital, quality seed, fertiliser, tools, water, technology, storage facilities, transport, markets, training and finance have resulted in the decline of the small-scale farmers' production (ITDG 2005a; Hedden-Dunkhorst *et al* 2001). For example, small-scale farmers in KwaZulu-Natal, who are among the poorest households in South Africa, face many challenges in their efforts to increase their income and to overcome food insecurity (Statistics South Africa 2001).

Small-scale farmers rely on governments and non-governmental organisations (NGOs) for agricultural support (Dawson 2003; Ngqangweni and Hendriks 2003). But many African governments and non-governmental organisations have failed for many years to recognise the role of small-scale farmers in increasing agricultural production (Bryant 1988).

In 2002, there was a concerted effort by Land Care (Farmer Support Group), the University of KwaZulu-Natal and Department of Agriculture to strengthen farmers' associations in Muden to increase their buying power of inputs, improve farming outputs and to obtain better and more accessible markets (Le Gal 2002). In fact, one of the main challenges would be to identify the needs of small-scale farmers in sustainable agricultural development.

Therefore, as small-scale farmers need support, this present research was designed to investigate whether NGOs, government, farmers' associations in Muden area have helped small-scale farmers to overcome their constraints. A small support initiative was conducted by the then University of Natal (today known as University of KwaZulu-Natal) and an NGO (FSG) in 2002 in order to strengthen the operation of farmers' associations. This present research was also designed to help the farmers' associations in Muden to evaluate themselves about their involvement in helping their small-scale farmer members, and take some action if needed.

1.2 Statement of the problem

This study aimed at investigating what changes had occurred in farming and farmers' associations in supporting small-scale farmers on the Mooi River irrigation scheme, Muden since a previous baseline survey conducted by Le Gal (2002). It investigated the activities of local farmers associations, the UKZN (University of KwaZulu-Natal), DAEA (Department of Agriculture and Environmental Affairs), and NGOs operating in Muden area and helped farmers determine the activities that could be done in order to overcome the constraints that limit small-scale farming activities.

1.2.1 Research Sub-problems

One: To determine changes reported by small-scale farmers and farmers associations since 2002 regarding their farming production and marketing.

Two: To determine reported support from farmers' associations, DoA and NGOs that have helped to overcome the constraints experienced.

Three: To determine what is needed by local farmers associations in order to improve farming outputs.

Four: To determine whether recommendations which resulted from the 2002 survey regarding health policy, land tenure policy, cash crops, involvement of block committees, payment for water, micro-credit system, collective organisation of input supply and marketing, improvement of technical assistance, efficient information system, relationship between public bodies, communities and farmers' committees were met by the year 2005.

1.2.2 Hypothesis

This study hypothesised that there had been no change in farming systems between 2002 and 2005. It also hypothesised that farmers' associations, government and NGOs, that

exist and working in Muden area had not assisted small-scale farmers at all. Farmers associations were unable to make suggestions for improving farming outputs. Furthermore, the recommendations from 2002 study (Le Gal 2002) were not met.

1.3 Study limitations

This research was limited to Mooi River irrigation scheme community and results were not generalized to other small-scale farmers outside the Mooi River area. The researcher could not speak the local language (Zulu) in Muden and a student interpreter was needed.

In this study part of a sustainable livelihood analysis was used because the aim of the study was to investigate the changes which had occurred in small-scale farming. For this aim, the sustainable livelihoods approach was limited to assets (human, capital, social, financial and physical assets) of small-scale farmers and how they coped with constraints. It did not include aspects of coping with shocks and stresses, nor with policy supports.

1.4 Definition of terms as used in this study

Small-scale farmers: Small-scale farmers are farmers who strive to produce both for their subsistence (i.e. household consumption) as well as for selling to earn an income for daily needs on plots of 0.5 to 3 Ha in size, but they are usually unable to achieve their goals due to lack of inputs, facilities or infrastructure. These farmers usually have a low level of capital, few on-farm investments and they have few market linkages (Msiska and Chibambo 2002; Singh 1972).

Small-scale farmers usually run their farming activities using family labour. They are characterised as 'resource poor' and this implies a limited capacity to intensify agricultural production systems (Chancellor undated).

Commercial farmers: Commercial farmers are farmers who strive to produce mainly to sell their produce and they are usually high-income farmers.

Non-governmental organisations: Non-governmental organisations are defined as non-membership development oriented organisations (Farrington 1996). The majority of NGOs are small but they are capable of responding flexibly and rapidly to clients' needs and to changing circumstances. They are also characterised by a work ethic conducive to generate sustainable processes and impacts (Farrington 1996). One of many NGOs' main concerns has been to identify the needs of the rural poor in sustainable agricultural development.

Farmer associations: Farmers' associations for small-scale farmers are often groups of rural producers coming together to form an organisation or association, based on principle of free membership, to pursue specific common interests. They are defined as voluntary and self-governing association of small-farmer groups formed at local level for the benefit of all its affiliated individual members (Anon 1999).

Constraints: In this study, constraints are the issues that hinder or prevent small-scale farmers from to achieving their vision according to the farmers themselves.

Cash crops: In this study, cash crops are considered to be the crops which are grown to be largely sold in order to generate more income for the farming household. Cash crops in this study are garlic and chillies.

1.5 Study assumptions

It was assumed that the information that small-scale farmers on the Mooi River irrigation scheme provided was reliable and true. It was also assumed that samples were true representations of small-scale farmers on the Mooi River irrigation scheme. Furthermore it was assumed that the interpreter (a student from Community Resources, University of KZN) would translate and transmit true information.

1.6 Research process

Small-scale farmers from the Mooi River irrigation scheme near Muden, central KwaZulu-Natal were sampled in order to evaluate if small-scale farming has improved over the previous three years. This sample was also used to evaluate if small-scale farmers received necessary support from institutions. The case study was also used to evaluate what was needed by the small-scale farmers who participated. This was explored *through the evaluation of the changes which occurred in small-scale farming on Mooi River irrigation scheme from 2002 to 2005*. This was also explored through the identification of support that small-scale farmers received from the farmers' associations, DAEA and NGOs. All information was obtained from the farmers themselves through survey interviews and focus group discussions.

1.7 Organisation of the thesis

Chapter 1 included a background to the study and an introduction to the methodology. Chapter 2 presents the review of literature which is relevant to this study, while Chapter 3 describes the area where the study was conducted. Chapter 4 presents the methodology used in this study looking at the research design, sample selection, tools used, and how data was analyzed. Chapter 5 will present the results and discussions and these will be discussed in relation to the four sub-problems of this study. Chapter 6 discusses conclusions, recommendations for the improvement of the study (what needs to be improved) as well as areas for further study.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Introduction

On the African continent, poverty and hunger are on the increase. The number of undernourished Africans increased by one million a year from 2000 to 2002 (ITDG 2005a). In South Africa, extreme poverty characterises rural communities and expresses itself in hunger, food insecurity and an absence of income generation from agriculture (Rijkenberg 2002). Millions of poor people living in rural areas worldwide remain trapped in poverty with disadvantages stemming from remoteness, lack of education, insecurity and unproductive jobs (UNDP 2003; IFAP 2004).

Many people in Africa live in rural areas and about 70 percent of Africans are involved in agriculture (IFPRI 2004). But their farming systems are not sustainable nor are their goals achieved because of various challenges that they encounter in their farming activities (IFPRI 2004). In this regard, improved agriculture, especially improved small-scale farming and marketing of products, can be one of the driving forces in reducing poverty in Africa as the majority of its people are poor and many of them are involved in farming activities (UNDP 2003).

2.2 The potential of agriculture in South Africa

The potential of agriculture in South Africa has been acknowledged in the literature. In South Africa in particular, and in Africa in general, agriculture is important in people's lives. Since many people in Africa are in rural areas and 70 percent of Africans are

engaged in agricultural production or agriculturally related activities (IFPRI 2004), improved agriculture is regarded as the most effective way to reduce poverty (Machethe 2004)

Agriculture is regarded as the backbone of Africa's economies, and people as well as nations depend upon agriculture now and will continue to depend on it in the future (Hawksworth 1984; ITDG 2005b). It is believed that agriculture can play a significant role in poverty alleviation since nearly 80 percent of the population in sub-Saharan Africa live in rural areas and 70 percent of this population are dependent on food production through farming or livestock keeping for most of their livelihood (ITDG 2005b).

It is argued in literature that the agricultural growth can be dramatic, and much more effective than other sectors at reducing poverty and hunger in both urban and rural areas. Agricultural growth has a strong and positive impact on poverty often significantly greater than that of other economic sectors (Anon 2005). In South Africa, agriculture supports the very existence and productive energy of the nation through food production. It contributes to economic growth by generating incomes and providing employment; and presents a social welfare net to the most vulnerable members of the South African society in the rural areas (Nieuwoudt and Groenewald 2003).

Literature shows that agriculture contributes meaningfully to the Gross Domestic Product (GDP) in South Africa (Lipton *et al* 1996). In this regard, agriculture's contribution to GDP in South Africa increased from R190 million in 1977 to R25 375 million in 2000 (Nieuwoudt and Groenewald 2003).

Agriculture in South Africa is regarded as a net earner of foreign exchange through the export of agricultural production (Nieuwoudt and Groenewald 2003; Machethe 2004). In fact, South Africa exports products such as maize, deciduous fruit, citrus, wool, mohair, groundnuts, cut flowers and bulbs, subtropical fruit and wine which are in great demand in foreign countries (Nieuwoudt and Groenewald 2003). Agriculture therefore, plays a meaningful role in South Africa. It has an impact on poverty alleviation, household and

national food security at affordable prices (Nieuwoudt and Groenewald 2003; Machethe 2004). In this regard, many rural households in South Africa participate at least in transitory agriculture and then they remain permanently involved in agriculture (Machethe 2004; Ministry for Agriculture and Land Affairs, undated). Agriculture forms an important buffer against poverty for many households and functions as a cushion for the poorest (Vink 2004).

Another potential for agriculture in South Africa is its contribution to better nutritional status especially for the households that are involved in agriculture (Vink 2004). Households that are involved in agriculture obtain improved dietary diversity and increased macronutrient intake. The improvement of agricultural productivity in rural areas of South Africa has the potential to improve household and nutritional status in South Africa (Vink 2004).

Agriculture in South Africa contributes to employment. It creates one out of every seven job opportunities and involves four million people or approximately 10 percent of the population (Nieuwoudt and Groenewald 2003). Looking at the rural areas of the former homelands, a survey conducted in 1997 showed that a total of 2.2 million people were employed in agriculture (Nieuwoudt and Groenewald 2003).

Clearly, agriculture plays a significant role in people's lives as well as that of their country and this has been reported in much literature. Agriculture and farmers are interrelated and one cannot exist without the other. There are two main categories of farmers: commercial farmers and small-scale farmers (see definitions under 1.4 on page 4). The next section focuses on small-scale farmers.

2.3 Understanding small-scale farmers

Small-scale farmers are regarded as people who farm small areas, not more than 5 ha and commonly much less (Chancellor undated). It was found that an average smallholding ranged between 0.5 ha and 3 ha. Small-scale farmers usually run their farming activities

using family labour. They are characterised as 'resource poor' and this implies a limited capacity to intensify agricultural production systems (Chancellor undated).

Small-scale farmers are not only characterised by the size of the land they farm but also by their capacity to farm. They are regarded as the farmers who strive to produce both for subsistence (i.e. household consumption) as well as for selling to obtain an income for daily needs.

Small-scale farmers are generally located in rural areas. The majority of them are unable to read and write or follow written instructions to be used in farming activities. This, in fact, results in missing important information regarding farming which affects their farming improvements (Ndokweni 2002).

2.4 Small-scale farming systems

There is very little information available about small-scale farming systems, but a few farming systems have been discussed (Rijkenberg 2002). A system, is defined conceptually as any set of elements or components that are interrelated and interact among themselves. Thus, a farming system results from a complex interaction of interdependent components that bear upon the agricultural enterprise of a rural household (Norman *et al* 1982). In this interaction, farmers are at the centre of interaction, exercising measures of control and choice regarding the types and results of the interactions. In this way, in their farming system, small-scale farmers need inputs such as capital, seed, fertiliser, herbicides and pesticides, tools, labour, and resources such as soil, water, climate and land. Farm inputs are basic and essential to any farm enterprise; without them, no output is possible (Norman *et al* 1982). It is found that improving markets for small-scale farmers can also be a major stimulus to sustainable intensification (Whiteside 1998).

In small-scale farming systems, farmers use throughputs which are: farming technologies, production techniques, processes and some farmers use irrigation. These will be discussed under 2.4.1.

In small-scale farming systems there are also outputs such as harvests, storage, processing, packaging, transporting and marketing of the produce. There is also a policy and infrastructural environment in which farming takes place. This influences the support provided and constraints experienced by farmers (Nieuwoudt and Groenewald 2003).

2.4.1 The inputs in small-scale farming systems

Some of the inputs in small-scale farming systems include capital, seed, fertiliser, herbicides and pesticides, tools, labour, soil, water, climate and land.

Capital

Capital input plays a significant role in small-scale farming systems. In fact, as Mwakalobo (2000) indicates, small-scale farmers can increase farm productivity by using adequate capital-intensive input levels in order to maximize their efficiency. In this regard, in order to achieve the use of capital intensive inputs, it is suggested that farmers should be encouraged to form groups or associations through which can take the advantages of increasing the bargaining power in both input and output markets (Mwakalobo 2000). Research done in Tanzania with small-scale farmers shows that farm capital input has the highest contribution to output. Capital input, therefore, appears to be relatively more important in terms of its contribution to output (Mwakalobo 2000). In this regard as Woodhouse (2002) shows, capital is very important in farming activities, as farmers are then able to invest in the necessary infrastructure for their farming and have access to market.

Unfortunately, in small-scale farming systems, poorer farmers do not have enough capital to invest in their farming activities and have difficulty accessing credit (Woodhouse 2002). In a study conducted in Malawi, the cost of borrowing money was high for small-scale farmers and this made it difficult for farmers to borrow and pay back the loans (Tafesse 2003).

Small-scale farmers usually do not have finance and this is illustrated in the study done in Kenya where lack of financial resources affected small-scale farmers' export share (Tafesse 2003). A study conducted through survey and focus group discussion in the Western Cape Province of South Africa shows that small-scale farmers identified lack of financial resources as the main constraint faced in their activities (Stefano 2004).

The failure of seasonal credit provision has been identified as a constraint to growth in smallholder agriculture in much of Africa (Moyo 2002). This is seen clearly in some parts of South Africa that lack of credit to purchase inputs restricts small-scale irrigation farmers' production significantly (Moyo 2002). As an example, credit provision through the Agriculture and Rural Development Corporation (ARDC), a parastatal terminated in 1998. Land Bank loan programmes which suppose to help small-scale farmers with credit are not widely adopted (Hedden-Dunkhorst *et al* 2001).

Another example is small-scale sugar cane growers in Umbumbulu, KwaZulu-Natal who face the challenge of lacking access to credit to assist them in their businesses. A survey conducted in the Umbulumbulu area showed that small-scale sugar cane growers faced the constraint of high loan interest rates which led to a request for grant funding (Bates 2002 cited by Nieuwoudt and Groenewald 2003).

Seed

Seed plays an important role in small-scale farming activities. Throughout Africa seed and food security are inseparable for small-scale farmers (Grandin 2003). Small-scale farmers mainly use their own seeds from the previous harvest for planting. This is practiced in their traditional farming systems where small-scale farmers select the largest, healthier looking plants and harvest the seed and store it, using structures made from local material. The seed is planted the following season. In this system the farmer replants traditional varieties and there are no additional costs involved (Msiska and Chibambo 2002).

Small-scale farmers also purchase seeds from local markets. They often have to travel long distances to purchase seeds and other farm inputs from the nearest towns (Owusu-Baah undated). There are small-scale farmers who cannot afford to purchase seeds because of the high cost and lack of cash to purchase them (Owusu-Baah undated).

Lack of seed is one of the major constraints for small-scale farmers to crop diversification and food security. In participatory research done in different communities in Malawi, farmers raised a concern of lack of seed (Msiska and Chibambo 2002). Small-scale farmers in Malawi who are involved in the commercialisation of seed production face the constraint of maintaining of seed quality and purity; effective processing and packaging; and timely supply of the seed to the market. In this regard, it is suggested that farmers associations have to be promoted to enable seed farmers to compete for better market prices (Msiska and Chibambo 2002).

Fertiliser

In small-scale farming, commercial fertiliser as an input is generally not available. Small-scale farmers in Africa, who are considered to be poor, mostly grow crops without chemicals and fertilisers. This is mainly the result of high costs of these inputs and most of small-scale farmers are unable to afford them (Mukhwana 2002). Instead, small-scale farmers use manure and compost from their livestock and household refuse as an option since fertiliser is costly and requires great technical understanding. Limited access to fertiliser can reduce farmers' production (Ansen *et al* 2004). This is different from commercial farming, which uses many chemicals, insecticides and fertilisers.

It was found that small-scale farmers in much of Southern Africa pay more for fertiliser (in relation to the price they receive for their produce) than many farmers in Asia (Whiteside 1998). In addition, the provision of technical services guiding the application of fertiliser is poor and in some places in Southern Africa, the service level needed is insufficient to attract service providers such as agricultural contractors and mechanics for basic machinery (Whiteside 1998).

Herbicides and pesticides

Weeds and pests can greatly reduce the yields of the crops. Small-scale farmers control weeds and pests in their farming. They usually use their hands or manual tools instead of mechanical means to control weeds and pests. Lack of materials such as masks and protective gloves especially when using sprayers, is a major challenge for small-scale farmers (Fowler undated).

It is important to apply herbicide and pesticides. This becomes very difficult for small-scale farmers because of the cost which is not affordable to the farmers. In addition, the lack of training in the use of herbicides and pesticides limits their effective use and correct application by small-scale farmers. For example excessive application may harm both the treated and subsequent crops, while reduced applications may have little or no effect on target weeds (Fowler undated).

Tools and equipment

In small-scale farming systems, there is acquisition of tools as inputs. Examples include spades, forks, hand hoes, sprayers, spreaders, knives, blade harvesting, bucket-lifting, sickles and scythes. Trucks and motorised water pumps are also tools which are important for small-scale farming. Trucks are used for transportation and making other equipment mobile. Motors for water pumps are used to provide water in a short time and in high volumes to large areas of land. It is very difficult for small-farmers to afford these tools as even elementary hand tools are often not affordable. As a result, farmers rent equipment from their community or from the local department of agriculture by paying a little amount of money. They also purchase used equipment because of the high cost of new ones (Mkhabela undated). According to FAO (2001), some farmers from different parts of Africa are still using hand tools and still irrigate their crops using buckets which are slow, cumbersome and labour intensive.

Labour

Labour is needed in small-scale farming systems and such farming is usually labour intensive (DFID 2002). Small-scale farmers use hired labour if affordable and available especially during planting, construction and maintaining irrigation furrows as well as during harvesting. Hired labour involves payment in cash or food (Ponte 2002, Mkhabela 2005).

Small-scale farmers use household labour which is the labour of some or all of the household members. This is in fact, the most common source and in some cases the only source of farm labour (Ponte 2002). Small-scale farmers in their farming systems adopt the use of exchange labour which can be recruited through social networks and performed by a group of individuals or households. This also involves labour arrangements known in Africa as 'beer parties' in which local brew and food are offered to the participants as a form of gratitude (Ponte 2002).

Soil

Small-scale farmers often live in areas of poor terrain, irregular rainfall, low soil fertility and inaccessible. Increases in soil acidity are accompanied by declining crop yields and reduced profitability (Le Gal 2002). To illustrate this: where maize was the preferred crop in a district in Western KwaZulu-Natal increases in soil acidity forced most farmers to resort to cropping with a particularly acid-tolerant strain of dry bean (Singh 2005). In small-scale farming systems, poor soil becomes a big challenge. Ruben (2005) shows that poor soil fertility such as nitrogen and phosphorus shortfalls at crucial times in the growing season limit growth rate and yields of crops.

In order to maintain soil fertility, small-scale farmers use crop rotation systems (Macher 1999). Crop rotation is regarded to be the process of planting a different crop after each previous crop, which allows the different plants to take advantage of nutrients that the previous plants did not use, and put different nutrients into the soil to avoid depletion of specific nutrients (Macher 1999). This way of farming is found to be advantageous to the

environment especially the soil as it does not become exhausted by crop production and retains the nutrients in the soil (Auerbach 2002).

Water

In small-scale farming, water plays a significant role but has become a challenge for small-scale farmers. For example in South Africa, the availability of water is a general problem to South African agriculture. Small-scale farmers need funds for investment in water works and their operation (Faysse 2004). In South Africa, getting access to water requires a legal water access such as the entitlement to withdraw a given amount of water from a river or a canal. It also requires technical water access such as the availability of equipment to bring water from the river to either field or the village. In addition getting access to water requires also the ability to pay the corresponding cost. In this case, small-scale farmers usually lack technical, maintenance and financial facility to access water to use in their farming activities (Faysse 2004).

In the Tzaneen area (South Africa), small-scale farmers do not have enough water to irrigate their farms. The municipality provides water only for household consumption, with the result that the water demand for small-scale agriculture and livestock is not met (Malzbender *et al* 2005). This is a big challenge as water becomes scarce and this affects production negatively.

The lack of water is a constraint to small-scale farmers. It is argued that one of the causes of the famine in African countries is poor farmers' lack of access to increasingly scarce water supplies (Earth Report undated). Small-scale farmers in South Africa seldom have water to irrigate their farms. In this regard, the largest water consumer in South Africa is commercial farming, using over half of South Africa's supplies. By contrast, nine out of ten black farming households have no supply of irrigation water (Earth Report undated). In South Africa, the most successful small-scale irrigation farms are those that developed from farmers' initiatives (Malzbender *et al* 2005).

Climate

Climate plays an important role in farming systems as the farmers depend on climate in order to decide about their farming activities. In the case of South Africa, the climate is characterised by severe droughts, floods, hail storms, and frosts which contribute to reduced agricultural productivity (Moeti 2005). Unpredictable weather conditions necessitate that the farmers should plan their production with the expectation of natural losses due to bad weather, pests and plagues. Many small-scale farmers cannot cope with these risks (Moeti 2005).

Land

Land is an important resource for small-scale farmers. Without land, no farming activities can take place. Small-scale farmers in South Africa are helped by the Department of Land Affairs which tries to redistribute farmland to landless farmers (Anon 2001). In fact, past government policies restricted low-income people from entering mainstream agriculture (Nieuwoudt and Groenewald 2003) but the current government is trying to give land to low-income people. It is argued that the government intends to transfer ownership of 30 percent of agricultural land over 15 years to low-income people (Agriculture and Land Affairs Portfolio Committee, 2000 cited by Nieuwoudt and Groenewald 2003). However, the progress of the land reform programme has been slow and the literature shows that land tenure forms have hardly changed in the communal areas despite attempts to provide greater tenure security (Vink 2004).

2.4.2 The throughputs of small-scale farming systems

Small-scale farmers use throughputs (or processes) in their farming systems such as farming techniques and irrigation as discussed below. These include all on-farm activities in order to achieve agricultural production.

Farming techniques

Generally small-scale farmers practice different farming techniques such as sequential cropping, mixed cropping, crop rotation and fallowing. Sequential cropping or

intercropping is the technique where the farmers sow two or three short duration crops in succession (Rajasekaran 1993). Sequential cropping contributes significantly to protein production for marginal and small-scale farmers.

Another technique that small-scale farmers practice is mixed cropping where farmers sow more than two crops at the same time (Rajasekaran 1993). Mixed cropping allows farmers to limit risks due to failure of any one crop and it is usually followed under rainfed conditions (Rajasekaran 1993; FAO 2001).

Small-scale farmers also practice crop rotation techniques in which farmers grow different types of crops in various seasons on the same land; and fallowing techniques that are an indigenous soil health care practice in which farmers let cultivated land lie fallow for a certain period of time before using it again (Rajasekaran 1993). There are also specific farming techniques required for specific crops such as timing of planting or water stressing, weeding strategies, contour planting in order to improve yields (FAO 2001).

Irrigation

Aphiphan (1992) states that, irrigation continues to play a vital role in farming activities in contributing to higher and more stable yields. Thus, expanding the irrigation system is an essential part of agricultural development for small-scale farmers since severe problems with irrigation have been realised (Aphiphan 1992). Looking at small-scale farmers in South Africa, many practice furrow irrigation. Farmers irrigate their farms by making small furrows from a canal into their plots and then flood the cropped area with water (Mkhabela 2005). Small-scale farmers also use drip, bucket, sprinkler and hand watering as irrigation systems (FAO 2001).

In some parts of South Africa, a few small-scale farmers share a main water canal for irrigation with the big commercial farmers; but small-scale farmers feel excluded from the allocation process that is considered to be controlled by the white farmers (Earth Report undated). Irrigation is a problem for small-scale farmers as a result of water scarcity and lack of irrigation equipment. The cost of irrigation equipment is significantly

limiting small farmer development in South Africa. Security of irrigation systems also is a problem for small-scale farmers (De Lange undated).

2.4.3 The outputs of small-scale farming systems

The output activities of small-scale farming systems comprise harvest, storage, packaging, processing, transport and markets. These all relate to the handling of agricultural products.

Harvest of products

In small-scale farming, harvesting is an important output activity. The farmers harvest their crops because they are ready to be consumed, sold or stored depending on their plans (Owusu-Baah undated). Generally, small-scale farmers use family labour to harvest their crops because of lack of equipment and the expense of hired labour (Ponte 2002).

There are harvesting equipment like harvesters, special picking machines, trucks and knives but many of them are specialized, expensive and also need maintenance. This indeed limits small-scale farmers from using them, which thus makes their harvesting work difficult, energy and time consuming (Schwenke 1991).

Packaging

Packaging of produce is important in farming. Small-scale farmers usually lack the packaging facilities and this causes damage to some crops. This occurs especially when the farmers do not sell their produce immediately and wait to get marketed. In this regard, some packaging facilities become important to protect the produce (Schwenke 1991).

Packaging also plays a role in marketing. High quality packaging not only helps to keep products in good condition, it is also important for food presentation and customer appeal. Small-scale farmers lack equipment for packaging their produce and this limits their markets. It is thus an area of vital importance for small-scale food manufacturer competing in today's marketplace (Fellows and Axtell 2002).

Storage

Small-scale farmers involve traditional crop storage techniques to store agricultural produce. In rural areas of KwaZulu-Natal, small-scale farmers use earthenware pots to keep water and traditional beer cool (Thamaga 2001). In addition, the earthenware pots store small amounts of beans, cereals, groundnuts, dried fruits, vegetables and seeds for a period of up to one year. The advantage of the earthenware pots is that they provide adequate storage durations but they have the disadvantage of limited capacity which may cause challenges in times of abundant harvests (Thamaga 2001).

Small-scale farmers also use baskets for storage. It is found that baskets can store certain produce for a period of up to one year. Their main disadvantage is their small size. In addition, insects can easily crawl inside and cause great damage to the stored produce (Thamaga 2001). Another method of storing crops is the use of silos, which are made to store large amount of grains. Building a silo requires hard work and it can be expensive especially because it has to be made from mud, cement, bricks, reeds and/or metal. It has been shown that such silos are not used very much by small scale farmers in South Africa compared to other parts of Africa. In South Africa traditional silos are mainly used in rural KwaZulu-Natal where it is called '*inqolobane*' (Thamaga 2001).

Small-scale farmers also use sack storage, underground storage and sun-drying storage. All of these crop storage methods help small-scale farmers keep the produce for sale later. In this way, it is argued that storage increases income, provided that an economically feasible storage method is used (Florkowski and Xi-Ling 1990). This is the reason why in order for small-scale farmers to achieve their goals, it is important to have improved crop storage facilities. In farming systems, small-scale farmers face transportation and storage costs, unfavourable prices and wastage due to the perishable nature of produce (Moeti 2005).

The lack of assembly and storage of products, which involves both the transport of crops to storage facilities and the provision of suitable storage facilities within a reasonable distance from producers, becomes a problem for small-scale farmers. In this regard, in

many rural areas, storage facilities are non-existent, unsuitable, or centralized in a way that crops need to be transported over long distances (Nieuwoudt and Groenewald 2003).

Processing

In small-scale farming systems, limited processing production is practiced but processing facilities and appropriate processing technologies are still lacking (Mkhabela 2005). In South Africa, small-scale farmers lack credit facilities, technologies for food processing enterprises, have poor access to information and lack of communication management in the processing industry in South Africa (Moeti 2005).

The high cost of capital and limited access to finance, high crime rates and stock thefts, lack of technical and market information and limited managerial and administrative skills are major problems for small-scale food processing industry in South Africa (Eldis 2000).

Transport

In small-scale farming systems, transport plays a significant role. Transport is needed to get produce to the market, to buy seeds and other inputs. Important as it is, affordable transport for small-scale farmers is a big challenge and this affects their farming activities. Small-scale farmers are often poorly serviced by public transport (Davis 2000).

Poor road conditions and poor public transport provision are major causes of transport problems for small-scale farmers (Nieuwoudt and Groenewald 2003). Davis (2000) agrees that rural farmers are unable to transport their agricultural outputs for sale at markets without considerable capital outlay with which to purchase an intermediate mode of transport, such as a truck, bicycle or donkey. The lack of own transport results in the necessity for farmers to sell or bargain produce at a much reduced price locally to traders, or pay excessive transport fees in order to be able to sell their produce outside the production area (Davis 2000). In addition, in South Africa many small-scale farmers do not have their own means of transport and become dependent on contractors, taxis or neighbours. In this case, hired transport becomes expensive.

In some provinces of South Africa, particularly Limpopo, KwaZulu-Natal and the Eastern Cape, roads are often in bad condition (Nieuwoudt and Groenewald 2003). In this

regard, deteriorating roads in the rural areas have increased the cost of transport (Nieudwoudt and Groenewald 2003). In addition, transport contractors are not prepared to service the rural areas as a result of the very bad condition of the roads.

Markets

In small-scale farming systems, markets are very important but they are generally weak. Small-scale farmers usually participate in local marketing systems which are characterised by weak market transactions with weak mechanisms for market-based risk management (Chancellor undated).

In addition, poor information systems for reporting local market conditions as well as coordination between input delivery, farm finance, and crop sales prevail (Tkavarasha and Jayne 2004). Limited market information has been a major cause of problems in smallholder markets in developing countries (Tkavarasha and Jayne 2004). For small-scale farmers to have access to market information, it is suggested that an increase in media coverage such as radio market reports, may increase the farmers' market information (Chancellor undated).

Groenewald (2000) stated that marketing services to small-scale farmers are often poor and sometimes non-existent as are the positions with roads, telecommunications, physical marketing infrastructure and financial services. This is shown in the following surveys conducted in different parts of South Africa:

- A survey conducted in Limpopo province in the Swayimana district, South Africa, shows that lack of markets affects small-scale farmers' productivity (Makhura and Mokoena undated cited by Nieuwoudt and Groenewald 2003).
- Another survey conducted in Embo in KwaZulu-Natal in South Africa through questionnaires aimed at evaluating farmers' perceptions about their crops, and their understanding of their activities showed that these farmers lacked good market for their produce. In addition, the farmers did not profit from their

production as the income was usually less than the production costs which included labour, either the farmers' own or hired labour (Ndokweni 2002).

It is thus clear that no development can be expected and no upliftment of the rural poor can occur in the absence of significant improvements in the marketing set-up servicing small-scale farmers.

It is found that also improving the way input markets work for small-scale farmers can be a major stimulus to sustainable intensification (Whiteside 1998). It is suggested that the future of the small-scale farming sector's ability to prosper in wider marketing activities will depend on strengthening the performance of the marketing system serving small-scale farmers, and on integrating the informal marketing system with the more developed "formal" marketing channels that are rapidly expanding (Tkavarasha and Jayne 2004).

Mkhabela (2005) reports poor links between farmers and the mobile traders who take advantage of that situation. They usually buy farmers' produce at very low prices locally and sell them to final consumers in urban areas at high prices.

Small-scale farmers also lack organisation, bargaining power and knowledge to make effective use of their membership in the Marketing Trusts that were formed after the marketing boards in South Africa were abolished (Nieuwoudt and Groenewald 2003).

In addition, small-scale farmers do not have proper facilities to store the product when the market price goes down until more favourable conditions occur. In this case, it is suggested that government could assist farmers by making low-cost market information accessible on a daily basis, linked to both national and global information systems utilizing modern communication technology (Mkhabela 2005).

Information

Small-scale farmers also face the problem of lacking agricultural information generally. For example it is shown that the lack of appropriate information by small-scale farmers is

a major stumbling block to their ability to make strategic choices and decisions (Kabelele 2003). In addition, small-scale farmers in Nigeria also lack information about pest hazards, weed control, moisture insufficiency, soil fertility, farm credit, labour shortage and soil erosion (Ozowa 1995). The information needed by small-scale farmers in Nigeria for example are grouped into five headings: agricultural inputs, extension education, agricultural technology, agricultural credit, and marketing (Ozowa 1995).

Information is needed to help small-scale farmers understand and meet some of the challenges that they face. Access to information is a challenging issue and it is found that despite the volume of printed agricultural information materials available in South Africa, only a small proportion of small-scale farmers in South Africa access written information on agriculture (Stefano 2004).

2.5 The importance and the goals of small-scale farming

The following discusses the importance of small-scale farming and relevant goals that farmers may strive for.

2.5.1 Importance of small-scale farming

According to Nieuwoudt and Groenewald (2003), the agricultural sector in South Africa comprises about 240 000 small-scale farmers, providing a livelihood for more than a million of their family members. An additional estimated three million small-scale farmers, mostly in the communal areas of the former homelands, produce food primarily to meet their families' subsistence needs (NDA 2001).

Small-scale farming plays a significant role in people's livelihoods and contributes to the development of households and the community. In fact, small-scale farming "is considered to be the most powerful and practical engine of rural economic growth and improved welfare for the poor" (Competence Areas and ongoing Regional and Global activities, undated). It is clear that small-scale farming contributes to economic and income generating opportunities. Research shows that in Nigeria, small-scale farmers make a significant and important contribution to the national products and is regarded to

be the main producer (98 percent) of the food consumed with the only exception being that of wheat (Ozowa 1995).

Cousins (2005) showed that small-scale producers in South Africa are often highly productive and make a major contribution to the household's economy. Rural households manage to secure more than half of their total livelihood from the land, and others regularly sell surplus to earn sizeable cash income (Cousins 2005). The income obtained from this farming can be used to pay for education, health facilities, electricity, as well as household equipment (Chancellor undated; Rijkenberg 2002).

With the necessary support, small-scale farmers have the potential to produce a marketable surplus (Machethe 2004). Small-scale farmers in Kenya for example with farms of less than two hectares increased their share of national agricultural production from four percent in 1965 to 49 percent in 1985 (Machethe 2004); while small-scale farmers in Zimbabwe tripled maize production surplus from ten percent in 1980 to 40 percent in 1987 (Machethe 2004). Households in South Africa, especially in the rural sector, who are engaged in farming activities tend to be less poor and have better nutritional status than other similar households that do not farm (Machethe 2004). A study conducted in Indonesia found that small-scale agricultural growth reduced the depth of poverty by 50 percent in rural areas and 36 percent in urban areas (Machethe 2004).

Small-scale farming plays an important role in development. It is shown that the increase in productivity in small-scale vegetable farming in Asia, for example, generated more income for farmers, more job opportunities in the vegetable sector, and reduced prices for consumers. A recent study showed that in developing countries, a one percent increase in small-scale agricultural productivity and outputs leads to a reduction of malnutrition in number of children by at least 0.4 percent (AVRDC 2002).

Improving production of small-scale farmers is among the crucial conditions for eradicating rural poverty (Machethe 2004). This requires tenure security and improving

access to reliable and effective farmer support services such as extension, finance and marketing. Small-scale farmers can increase productivity and production significantly according to Nieudwoudt and Groenewald (2003) with adequate access to farmer support services.

Another importance of small-scale farming is its use of mixed cropping in farming as it increases household income and food availability. Research on ecological agriculture shows that mixed farms provides more equitable and sustainable livelihoods (Mazhar *et al* 2002). Crop diversification, used in small-scale farming is labour intensive and time consuming and requires necessary labour inputs with its different planting and harvesting schedules (FAO 2002).

2.5.2 The goals of small-scale farmers

Small-scale farmers have a variety of goals to achieve through their farming activities:

- Small-scale farmers want food security, first for the household and then for their communities (Chancellor undated; Rijkenberg 2002). This is very important and it has to be supported by NGOs, government and private sector. Food security in fact, is defined as access by all people at all times to enough food for an active and healthy life (Devereux and Maxwell 2001). Once small-scale farmers achieve food security, it can change a situation of hunger and starvation as well as malnutrition. Literature shows that the number of undernourished Africans increased by one million a year from 2000 to 2002 (ITDGa 2005). In South Africa, about 14 million people are said to be vulnerable to food insecurity and 43 percent of households suffer from food poverty (Machethe 2004).
- Small-scale farmers also aim to generate cash income from their farming activities. Income is necessary to meet household needs such as education, health, electricity, and water (Chancellor undated; Rijkenberg 2002).

- Small-scale farmers also have goals of being employed and having a better standard of living. This is very important especially because of the increasing problem of unemployment in African communities (Rijkenberg 2002). It is found that in South Africa, small-scale farming creates employment for many people (Nieuwoudt and Groenewald 2003). This shows that if this farming sector obtains the required support, rural migration to urban areas to search for jobs may decrease and people would feel the need to remain in their villages to promote agriculture.
- Another goal of small-scale farmers is to be good farmers: to maintain healthy soil, diverse crops, and to build on their indigenous knowledge. They also have a vision of strengthening their practical skills and local institutions (FYF 2002). Maintaining healthy soil is important because when the soil is healthy, farmers obtain increased yields. In order for this vision to be achieved, there is a need for NGOs, government and other institutions to be involved with and to support small-scale farmers in terms of obtaining credit and water, technical assistance and access to relevant agricultural information.
- Small-scale farmers want to farm a diversity of crops to reduce risk. This can also contribute to nutritious and sufficient food, increased production, and income generation. In this regard, farmers will need reliable supplies of inputs, e.g. seed. For example as FYF (2002) illustrates, many countries in southern Africa are prone to food shortages in times of drought because they rely heavily on only one crop (maize) which is not drought resistant (FYF 2002); diversity of crops in this case is better suited to unpredictable droughts. Should one crop fail, another may well survive the drought. When there is a diversity of crops, the risk of food insecurity and lower production can be minimized and even prevented.
- Concerning the goal of farmers to build on their indigenous knowledge, it is very important to support farmers' initiatives and consider their choices of farming methods and allow them to control their resources not people from outside their

communities (FYF 2002). It is true that small-scale farmers have knowledge about farming. It is important for those, who are involved in helping such farmers such as NGO's, government and private institutions consider farmers' initiatives and build on them instead of imposing new regimes. It is understandable that small-scale farmers need guidance and direction regarding farming systems but this can be more effective if farmers' knowledge is taken into account. Farmers may not understand these especially because there are few educated farmers living in rural areas in Africa (FYF 2002).

- A goal that small-scale farmers in Embo community in KwaZulu-Natal have, is shown through sustainable livelihood analysis, is to become successful farmers with advanced farming knowledge, experience and more market access for their produce (Ndokweni 2002). With regard to the market, small-scale farmers have a goal of having strong markets so that they can rely on selling their produce at a favourable price. This goes with a vision of having a packhouse and access to market information (Ndokweni 2002).

2.6 Supporting small-scale farmers

There are different organizations that could support small-scale farmers which are of great importance in helping small-scale farmers achieving their goals. These include NGOs, government, farmers' associations, universities and other support (businesses and private companies). It is suggested from literature that a strong coalition between national governments, the private sector, non-governmental organisations and international donor community could be important in order for small-scale farmers to achieve their goals (Spencer 2001).

2.6.1 Non-governmental organisations' support for small-scale farmers

NGOs are defined as non-membership development-oriented organisations (Farrington 1996). The majority of NGOs are small and they are capable of responding flexibly and rapidly to clients' needs and to changing circumstances. They are also characterised by a work ethic conducive to generating sustainable processes and impacts (Farrington 1996).

NGOs are recognized as well suited to assist the rural poor through different types of social and poverty alleviation programs (Farrington 1996). As indicated by Swanson and Samy (2002), most NGO staff members are motivated to organise small-scale and other marginal farmers so that they can better access technology and resources. In fact, NGOs have been found to offer a range of agriculturally related services as described below.

Swanson and Samy (2002) indicate that NGOs have become important institutional players in rural development. Some national governments have shifted extension responsibilities to NGOs. In the same way, international donors view NGOs as more effective in community mobilisation. NGOs have a comparative advantage of working with small and marginal farmers including women and ethnic minorities (Swanson and Samy 2002). NGOs have been very involved in agriculture, and as GFAR (2002) has shown, in the case of agricultural research for development, NGOs have advocated the need for greater focus on farmer-led research and extension, sustainable farming systems, greater recognition of indigenous knowledge and gender equity. In fact, in the role of advocacy, NGOs' orientation is to influence agricultural policies, priorities and strategies for the benefit of the farmers (GFAR 2002). NGOs serve as 'watchdogs' and as the voice of the marginalised groups.

In Malawi, NGOs have been providing credit facilities and farm input safety nets. An NGO in Malawi has also been providing improved seeds and plant materials of roots and tuber crops to farmers (Msiska and Chibambo 2002). A NGO known as Concern Universal, distributed seed after its participatory research in Malawi identified lack of seed as one of the major constraints to crop diversification and food security. In this case, Concern Universal started seed propagation in the 1998/1999 season and 594 farmers participated. Of these, 290 farmers propagated beans, 3 propagated soybean, and 301 propagated groundnuts. Each farmer received 10-30kgs of seed at the beginning of the season. During the 1999/2000 growing season, Concern Universal distributed legume seed for propagation to 108 farmers. In the 2000/2001 season, 654 farmers propagated

groundnuts and beans, and more than 7 tonnes of bean seed were planted (Msiska and Chibambo 2002).

In addition, Concern Universal in Malawi trained a total of 35 community facilitators. This shows that NGOs are assets in helping small-scale farmers achieve their goals. In this regard, it is found that when NGOs support small-scale farmers adequately such as providing certified seed and training, the farmers are capable of producing good quality seed. The experience from Malawi also means that adoption of seed propagation by small-scale farmers has led to increased seed availability and crop diversification. This has resulted in some farmers adopting seed propagation as a viable enterprise (Msiska and Chibambo 2002).

In South Africa, Farmer Support Group (FSG) and Land Care programme that work in Msinga have been providing agricultural information by distributing a newsletter such as *Vikela*, a publication characterised by articles on small-scale farmers' achievements and activities in South Africa (Stefano 2004). Concerning Land Care, the South African government is seeing the Land Care initiative as a major strategy to achieve resource conservation goals. The Land Care initiative focuses on controlling soil erosion, weeds and overgrazing (Carnegie et al undated). The basis of Land Care in South Africa is to encourage small-scale farmers and other land users to take more responsibility for land management, through identifying, researching and possibly solving their own land degradation and conservation problems (Carnegie *et al* undated).

NGOs have been involved in providing technical inputs, information and training as well as organisational support services to farmers (Swanson and Samy 2002). This shows that NGOs can play an important role to assist farmers to achieve their goals. Msiska and Chibambo (2002) feel that NGOs should be more involved in training farmers in order to promote farmers' abilities to understand and articulate their farming activities such as the use of new technologies, accessing agricultural information, linking with other farmers and identify markets (Msiska and Chibambo 2002).

NGOs could encourage farmers to form farmers associations in order to give farmers power and ability to compete for better market prices (Msiska and Chibambo 2002). They could also help by gaining access to information through catalogues and databases to inform farmers about the markets and to learn from other farmers' experiences, lessons as well as information regarding farming activities (Msiska and Chibambo 2002). As these farmers lack access to information, governments and NGOs have an important role to play by informing and assisting farmers with decision-making, and in linking farmers with research-based information in different ways: these can be done through farm visits, demonstrations, training programmes, workshops, and by supplying printed information materials (Stefano 2004). In Nigeria, awareness was raised among rural villagers concerning the availability of information from institutions and organisations such as government departments, international, local NGOs and universities (Stefano 2004).

NGOs can assist farmers with adequate and well-trained advice regarding farming activities so that the farmers could produce quality products, well-packaged and labelled in order to attract good buyers and to obtain a good market response (Msiska and Chibambo 2002). Small-scale farmers need to have access to markets, especially export markets which provide high-value market opportunities for farmers (Dawson 2003). If it is very difficult for small-scale farmers to enter those markets, it is then suggested that NGOs and government should play a meaningful role in market identification and the design thereof as well as the implementation of suitable market interventions (Dawson 2003).

In addition, NGOs can empower farmers to do things for themselves without depending on NGOs or government for everything (Msiska and Chibambo 2002). NGOs could be involved in community empowerment and capacity building by training small-scale farmers in all aspects of farming including seed propagation and business. For example Concern Universal in Malawi trained farmers and provided them with skills to propagate seeds as a business (Msiska and Chibambo 2002).

2.6.2 Government support for small-scale farmers

The government of South Africa has been supporting small-scale farmers. In KwaZulu-Natal, for many years, the DAEA was involved in poverty alleviation programs. DAEA has been providing extension services to facilitate, amongst others, the establishment of community gardens. Extension officers also provide information assistance to subsistence farmers (Hlongwa 2002; Ndokweni 2002). In addition, extension officers also assist with crop production projects which primarily cultivate maize, beans and wheat. Furthermore training, infrastructure and services are to be provided to assist and support impoverished farming efforts (Hlongwa 2002).

It was found that government policy has become supportive of small-scale farmers. The Marketing of Agricultural Products Act (Act No. 47 of 1996) aimed to help new small-scale farmers in KwaZulu-Natal to enter the domestic and export markets which offer good prospects for future job creation and marketing services to new farmers (Ministry for Agriculture and Land Affairs, undated). In this regard as Stefano (2004) states, the KwaZulu-Natal Provincial Department of Economic Development and Tourism boosts support for small-scale farmers in the Durban Metropolitan area by funding pilot organic farming and marketing projects. There may be thus opportunities for small-scale farmers to supply local markets as a result of government support.

In addition, since 1994, the South African government, through National and Provincial Departments of Agriculture, has repackaged scientific and technical information as information packs (NDA 1998), booklets, posters and pamphlets to small-scale farmers (Morris 2001). As an example, small-scale farmers in Muden received an agricultural booklet to help them in their farming activities (Stefano 2004). This is very useful since information is among the major issues that small-scale farmers need in order to achieve their goals.

The involvement of the government to help small-scale farmers has been also noticed in Namibia where the Namibian government actively encourages, for example, a small-scale farmer cooperative in producing seed (Whiteside 1998).

2.6.3 Farmers' association support for small-scale farmers

Farmers' associations for small-scale farmers are often groups of rural producers coming together to form an organisation or association, based on the principle of free membership, to pursue specific common interests. Farmers associations can be task orientated as the farmers work together as a group striving to improve their farming; they are also network-oriented seeking to link farmers with service providers. Furthermore farmers associations can also be advocacy orientated trying to change the policy environment (Whiteside 1998; FAO 2001).

Farmers' associations are used by their members and by service providers (whether commercial, government or NGO) throughout Southern Africa as a way of lowering transaction costs (Whiteside 1998). A study conducted in Zambia shows that in 1994/1995, farmers experienced drought and this constrained their ability to pay for spraying. Farmers also encountered difficulties in establishing a viable pricing system for covering their costs, but once they came together and formed an association, they succeeded in arranging spraying sessions approximately every two weeks for many farmers. In the 1995/1996 wet season, eighty associations in Zambia were established and developed a system for permitting members with temporary cash shortages spraying on credit (Whiteside 1998).

Farmers' groups or associations sometimes develop further than just linking small-scale farmers to service providers, and become service providers in their own rights. Likwama Farmers' Cooperative Union (LFCU) in Namibia has been successful in developing service provision such as supplying seed, fertiliser and ploughs alongside other activities at competitive prices. It also established maize, millet and sorghum processing facilities (Whiteside 1998). In addition, LFCU was involved in advocacy work at the national and local level towards creating an enabling environment for agricultural activities for its own and other organisations' development. This means that farmers' associations can play a very meaningful role in overcoming small-scale farmers' constraints and help them achieve their goals (Whiteside 1998).

It is argued by Whiteside (1998) that although farmers' associations can lower transaction costs and are perceived by farmers to bring benefits, it does not necessarily mean the withdrawal of external support. In addition, it is suggested that perceived benefits of association and farmer capacity need to be high enough to overcome the increased problems and local contributions which are likely to be needed especially after funding and other support have ceased. As Whiteside (1998) and FAO (2001) suggest, farmers' associations need external support such as effective networks and transport infrastructure which can provide the conditions for sustainability. These are usually lacking.

Farmers' associations are very important and they are regarded as one of the assets that small-scale farmers can use to overcome their constraints. It was found that throughout Southern Africa, small-scale farmers organize themselves into associations, usually on national scale, to advocate policies and services that more closely meet their needs. The challenge for small-scale farmer associations has been poor resourcing in comparison to the large-scale farmers' unions (Whiteside 1998). As it is stated in Skills Development Act, No. 97 of 1998 (Vink 2004), continuing training for local association members is needed in order to empower them to participate in local and national level affairs. For example, association financial and record keeping systems need to be decentralised and become as bottom-up as possible in order to meet the needs of the association's members.

It is crucial for large-scale associations and political mobilising power of the small-scale farmers' associations to be collaborative. The problem here is that often the interests of these two groups are clearly opposed and needs to be addressed (Whiteside 1998).

2.6.4 Other agricultural institutional support for small-scale farmers

The variety of agricultural support institutions include banks, seed and chemical companies, private consultants and researchers. They provide many services.

Small-scale farmers in South Africa have access to agricultural credit: The Land Bank that has been financing agriculture since its inception in 1912. In this case, the Land Bank finances 25 000 commercial farmers and over 90 000 small-scale and emerging farmers

and rural dwellers (Nieuwoudt and Groenewald 2003). Similarly Moyo (2002) states that Ithala Bank also provides seasonal credit to small-scale and disadvantaged farmers. This, in fact, is an asset that small-scale farmers in South Africa have especially because of the constraint of credit availability.

Private sector firms, including multi-national seed and chemical companies, have become important contributors to agricultural technology transfer to farmers, especially for the commercial farm sector but also for small-scale agriculture (Swanson and Samy 2002). In addition Ndokweni (2002) reported that a private sector consultant to Embo farmers in KwaZulu-Natal was involved in the marketing of EFO (Ezemvelo Farmers' Organisation) members' organic produce, organising funding assistance from government, logistics assistance, educating on some aspects of organic farming and marketing as well as building infrastructure for economic development. Through the consultant's company that owned a pack house, the consultant bought produce from EFO farmers and sold this to a large chain store. It was also found that a second national chain store signed a contracting agreement with the EFO members to procure produce from the farmers and package it on-farm before distributing it to the national chain stores (Ndokweni 2002). This support to farmers at Embo meant that farmers benefitted meaningfully from the commercial requirements.

The researchers who help farmers are another support for small-scale farmers. For example students and staff from the University of KwaZulu-Natal help small-scale farmers in Embo with advice on technical issues related to agriculture. They make contacts with funders and facilitate interaction between EFO and sponsors. They also act as gatekeeper for EFO to protect against exploitation (Ndokweni 2002).

2.7 Constraints for small-scale farmers

This section deals with small-scale farmers' additional constraints which are: Literacy, credit, HIV/AIDS and certifications. Other constraints were covered in 2.4.1.

2.7.1 Literacy and credit

The low levels of literacy limit small-scale farmers from obtaining credit. In the case of Nigeria for example, illiterate small-scale farmers are mostly unaware of existing loan facilities (Ozowa 1995). Farmers have problems in identifying sources of loans such as names of lenders, location and types of existing credit sources. The issue of interest rates, which are usually high, limited loan amounts and modes of repayment are often not favourable for small-scale farmers and cause problems (Ozowa 1995).

2.7.2 HIV/AIDS

HIV/AIDS is another constraint for small-scale farmers. HIV/AIDS affects agriculture, destroys social capital and increases poverty. The capacity of small-scale farming households is limited as HIV/AIDS prevents them from utilizing their land effectively. Infected members are too weak to perform farming activities, others are withdrawn from farming to care for the ill and members with farming skills die from the disease (Nieuwoudt and Groenewald 2003; ITDG 2005b).

2.7.3 Certification

Small-scale farmers who are involved in organic farming face the constraints of organic certification and this poses many barriers to small-scale farmers to enter into both export and local markets (Stefano 2004). This is mainly because certification is too expensive for small-scale farmers who are generally poor. It is then important that in order to overcome the constraint of certification, small-scale farmers need to form producer groups or co-operatives to reduce financial demands on individuals (Stefano 2004).

Small-scale farmers especially in Sub-Saharan Africa face the challenges of the decline in the worldwide relative prices for traditional commodities compounded by increasing costs of inputs at the farm level. These are often due to structural adjustment programs and globalisation that have removed subsidies and increased supply costs (Spencer 2001).

2.8 The sustainable livelihood framework (SLF)

Sustainable livelihoods framework has been used by many different development organisations such as British Government's Department for International Development (DFID), the International Institute for Sustainable development (IISD), the People Centred Development Forum (PCD Forum) and Oxfam (de Gruchy 2005). Sustainable livelihoods framework is a model that has been used to help people understand how they survive, the resources they draw upon, the strategies they adopt, and the outcomes that emerge (de Gruchy 2005; Davis 2000). SLF is a learning process approach, it puts people's priorities first and it ensures sustainability through self-help (Conroy and Litvinoff 1988).

The concept of livelihoods comes at the heart of this framework. The UNDP (1999) defines livelihoods as the assets, activities and entitlements, which people utilize in order to make a living. The livelihood assets are natural, social, political, human, physical, and economical that can be used to support livelihoods. In this definition, the sustainable livelihood framework recognizes that all the people, even the poor are able to live and enhance their lives using a range of assets and strategies. A livelihood is considered to be sustainable when it can cope and recover from stresses and shocks and maintain its capabilities and assets without undermining the natural resource base (de Gruchy 2005).

The SL framework identifies key elements, factors and relationships that affect the lives of poor communities and how they interact with each other (See Figure 2.1).

The basic concept is that the quality and sustainability of livelihoods depend on the strategies communities develop to manage the assets that are under their control, within an environmental and institutional context, over which they may have little control (Young and Phillips 2000).

Sustainable livelihoods framework

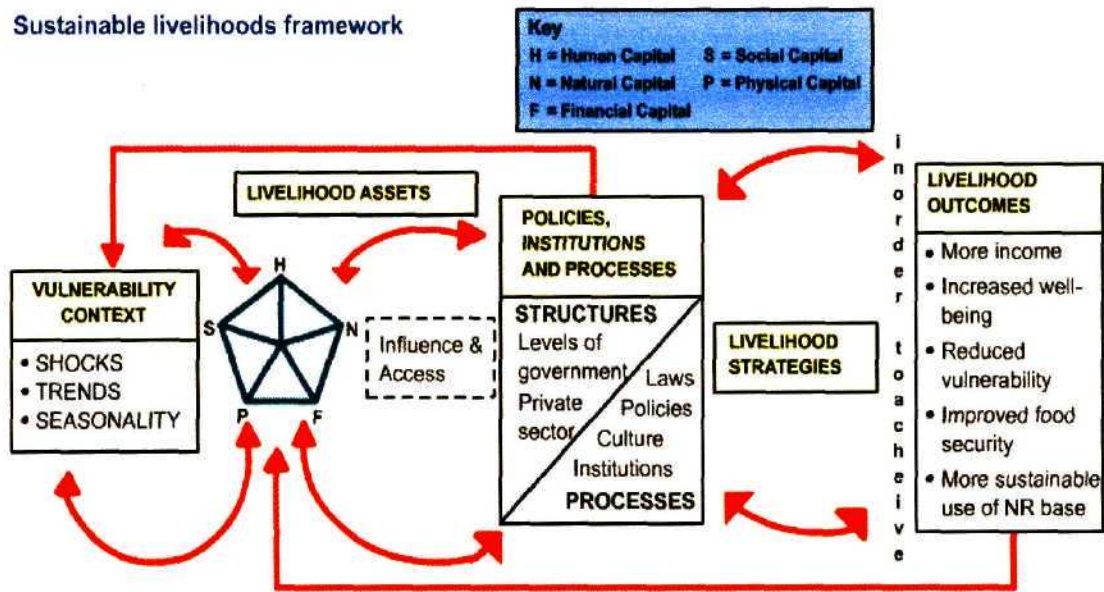


Figure 2. 1: Sustainable livelihood framework (DFID undated)

The framework is flexible and can be used to summarise the issues that influence livelihoods from different sectors such as transport, water, sanitation, education and marketing. In addition, as Davis (2000) states, the sustainable livelihoods framework can be used to summarise the livelihood processes of individual households, villages and districts to reflect the livelihoods status of a given population in an urban or rural setting. Furthermore it can identify particular problem areas which hinder livelihood improvements, and therefore foster recommendations that aim to strengthen the assets of the poor (Davis 2000).

Through the application of the sustainable livelihood analysis, assets can be identified and possible interventions to reinforce the existing assets explored (Davis 2000). The livelihoods of people are not always sustainable. In such cases, a sustainable livelihood approach provides a way in which strategies can be evaluated, choices can be re-thought, and changes can be made in order for livelihoods to be sustainable (de Gruchy 2005).

2.8. 1 Sustainable Livelihoods Analysis (SLA)

According to IDS (2000) sustainable livelihoods analyses are centred on people and their livelihoods. The SL analysis prioritises people's assets (tangible and intangible); their ability to withstand shocks (the vulnerability context); and identify policies and institutions that reflect poor people's priorities, rather than those of the elite. They build on people's strengths rather than their needs. They bring together all relevant aspects of people's lives and livelihoods into development planning, implementation and evaluation and as such is a useful research tool (IDS 2000). SLA ensures micro-level realities and informs macro-level institutions and processes. It also works with public, private and civil society actors. Furthermore it ensures environmental, economic, institutional and social sustainability and this sustainability is interlinked and it cannot be separated (Hussein 2002).

SLA aims to find out about livelihoods of the people and how sustainable their livelihoods are as well as identifying the problems that they face (Hussein 2002). It identifies the vulnerability context of the people where it describes the external environment in which people live their lives. The vulnerability context could involve shocks which are aspects like sickness, injury, or death in the family, natural disasters, violence, crop failure and eviction (de Gruchy 2005). In the vulnerability context, there are also trends which are more predictable such as trends in population, technology, government, social services, economic opportunity and urbanisation. Considering seasonality, issues such as prices, production, health and employment could be analysed. Vulnerability contexts in sustainable livelihood analysis helps to see that people are at risk and that their livelihoods are subject to detrimental influences (de Gruchy 2005). (See Figure 2.1).

As sustainable livelihoods consider the poor, small-scale farmers are also considered through a SL analysis. In this regard, DFID, in its sustainable livelihood analysis, aims at ensuring that agricultural growth takes place and small-scale farmers benefit from it (DFID 2002). This implies that SLA seeks to create a policy and institutional environment that provides opportunities for poor people to derive a better livelihood from

agriculture. This includes the reform of policies, institutions and laws to improve poor people's access to land, markets and services (DFID 2002).

In describing the assets available, (See Figure 2.1) SLA uses the term capital. These assets contribute to sustainable livelihoods of the people (DFID 2000):

- Human capital refers to skills, knowledge, good health, and ability to labour and be productive.
- Natural capital refers the natural resources that are available to households and communities in pursuit of their livelihoods. This includes clean air, trees, plants, land, sun and the rain.
- Financial capital is the money that is available to the household, either in the form of stock, such as cash, bank deposits, livestock, jewellery, and credit in the form of regular inflows of money from wages, social security, and other remittances.
- Physical capital refers to infrastructure such as transport, shelter, energy and communications. Tools and equipment are also part of physical infrastructure, which is needed to support a livelihood.
- Social capital refers to social resources upon which people draw in pursuit of their livelihood objectives. This includes networks and connectedness, trust, reciprocity and exchange.

SLA considers also the policies, institutions and processes which affect people's lives. These refer to structures in community that control the ways in which assets can be utilised in people's livelihoods and they can be changed by people's interaction (de Gruchy 2005). Policies refer to deliberate actions designed to achieve particular goals or targets. Institutions refer to organisations or agencies and the way in which they function and interact with each other. SLA processes refer to the ways in which policies,

organisations and institutions can change over time, and open up a way in which various role players including the poor can participate in shaping the policies and institutions which order their lives (de Gruchy 2005). This is why SLA has to cover all aspects that can influence or affect people's way of achieving their sustainable livelihoods and goals (Ndokweni 2002).

SLA considers also livelihood strategies such as choices that people can adopt to achieve their goals. As Butler and Greenstein (1999) put it, greater choice and flexibility yields greater capacity to survive and adapt to shocks and stresses from a vulnerability context.

Livelihood outcomes are also focused on in sustainable livelihood analyses. After people adopt some strategies to overcome stresses and shocks in order to achieve their livelihood objectives, the results are a range of livelihood outcomes. See Figure 2.1. In SLA, outcomes are identified in order to determine how successful households are in their livelihood strategies (Frankenberger undated). The outcomes of various livelihood strategies may be negative, and may serve to undermine the assets and entitlements of people (de Gruchy 2005). In this way, SLA recognises that livelihood strategies have the ability to either enhance or hinder the long-term livelihoods of people. It then seeks positive outcomes such as more income, increased well-being, reduced vulnerability, improved food security and a more sustainable use of the natural resource base (de Gruchy 2005; DFID 1999).

2.8.2. Sustainable livelihood methods and techniques

UNDP (2003) has developed five methodologies associated with the sustainable livelihood approach, which are:

- Assessment of the risks, assets, entitlements and indigenous knowledge base found in a community which are obtained through participatory methods.
- Analysis of the macro, micro and sectoral policies and governance which affects interrupts on people's livelihood strategies;
- Identification of the potential contributions of technology to complement indigenous knowledge to improve livelihoods;

- Identification of social and economic investment opportunities; and
- Checking if all the above stages are integrated and interactive.

SLA uses participatory techniques in order to involve people in the processes that affect their lives and empower them in dealing with issues that affect their livelihoods (DFID 2000). Selected methods of participatory learning and action (PLA) or participatory rural appraisal (PRA) techniques are discussed in the following section. Various participatory methods that can be used in sustainable livelihood analysis are:

- Timelines are historical profiles of longer-term events or trends. Timelines according to DFID (undated) are particularly useful for vulnerability context and policy change.
- Seasonal calendars are also participatory methods used in conducting sustainable livelihood analyses and they are a graphic depiction of seasonal events or trends. They are useful for vulnerability contexts, assets and strategies (DFID undated).
- Transect walks are also used as a method in sustainable livelihood analysis where land-use maps based on walking through particular areas are adopted. Transect walks are particularly useful for assessing quality and quantity of natural capital (DFID undated).
- Maps identifying natural and other resources are used in SLA. These are useful for identifying the existence of shared natural capital. There are also social maps locating key social features. These are useful for access to services and infrastructure (DFID undated).
- Preference ranking is ordinal ranking based on pair-wise comparisons, with reasons stated for the choices made. This is useful for livelihood strategies, assets, and access to services (DFID undated).

- Wealth ranking assigns households to well-being categories. It is useful for strategies and assets needed to exit from poverty and to describe relations between social groups (DFID undated).
- Matrix ranking places preferences based on defined criteria with scoring. This is useful for access to infrastructure, livelihood strategies and investment choices (DFID undated).
- Venn diagrams are diagrammatic representations of key institutional interactions is used. This method is used to identify social capital, relations between social groups, institutional and policy environment (DFID undated).

SLA uses other techniques to support the data it provides. These are:

- Secondary sources, which are methods to obtain data regarding people's livelihoods. DFID (2000) shows that secondary sources often provide a good overview of human capital issues. In this regard, governments collect much data on human capital. In livelihood analysis context, this type of data is most useful when collected at disaggregated levels within countries, e.g provincial or regional human development reports (DFID 2000).
- Sample survey is another technique that used in sustainable livelihood analysis (DFID 2000). Sample surveys are useful for collecting less controversial data, including a variety of indicators of human capital such as household demographics, education levels and access for various family members. Sample surveys can also provide some indication of a household's or individual's ability to command labour beyond their own direct labour contribution. In this regard, more qualitative methods such as key informant interviews, focus group discussions and participatory techniques are used in order to complement surveys (DFID 2000).

These techniques and methods used in sustainable livelihood analyses are very important and should to be used because sustainable livelihoods is a broad agenda that requires a wide range of analytical skills and techniques. These techniques and methods used in sustainable livelihood analyses help to gain an overview that enables follow-up investigation of factors that seem to pose particular problems or offer special opportunities for the poor (DFID 2000).

2.9 Summary

Small-scale agriculture plays a significant role in a rural household, in a community and in a nation as a whole. Small-scale farmers are the farmers who live in rural areas and who strive to farm for their subsistence and also to sell the surplus in order to obtain an income to meet their household's needs.

Small-scale farmers work within a farming system which includes inputs, throughputs and outputs to markets. These subsystems are important and essential in small-scale farming activities but they are usually lacking because of their high costs and the lack of knowledge in using them.

Small-scale farmers have a variety of goals that they strive to achieve in their farming activities. These are: food security, generating income, job creation, and social upliftment. Although small-scale farmers have goals to achieve in their farming, they face constraints such as lack of capital, seed, fertiliser, herbicides and pesticides, tools, labour, soil, water, climate, land, lack of farming technologies, irrigation, harvesting, packaging and improved storage and processing facilities. Small-scale farmers also lack transport, markets, organisational structures, information, and illiteracy and face the problem of HIV/AIDS. These constraints hinder the achievement of small-scale farmers' goals.

Clearly, small-scale farmers need support in their farming activities. The supports that small-scale farmers have as discussed in this chapter are: Government, NGOs, private sector and farmers' associations. All of these institutions have a role to play in order to

assist small-scale farmers to achieve their goals and to minimize the constraints that they face in their farming. These roles will be further investigated in this study.

This chapter also discussed the sustainable livelihood framework which could be used to understand how people live their lives, the resources they draw upon, the strategies they adopt, and the outcomes that emerge. Sustainable livelihood analysis looks at people's vulnerability context, which is made of shocks, trends and seasonality. It also considers five groups of assets that people have: human, social, natural, capital and physical capital. Policies, institutions and processes that affect people's livelihoods are included. In sustainable livelihood analysis different participatory techniques are used in order to allow people to participate and learn from the process in analyzing issues that affect their lives. These are timelines, seasonal calendars; transect walks, resource maps, social maps, preference ranking, matrix ranking, wealth ranking and Venn diagrams. These are often conducted with community groups as part of focus group discussions.

SL framework was important for this study as it was used to help the participants to identify the useful assets to improve their farming. The vulnerability context of SL framework was used in this study to analyse the farmers' vulnerability. In addition some of SL framework data collection techniques were used to help farmers identify their own situations and constraints, as well as aid in the identification of plans of action to be taken to improve their small-scale farming. This is reported in detail in Chapter four, describing the methodology used.

CHAPTER 3

DESCRIPTION OF THE STUDY AREA

3.1 Introduction

This chapter describes the area where this study was conducted. It will look at the general information about Mudén and the irrigation scheme on which the study was conducted, providing information regarding the location of the area, the climate and the type of soil. In addition the chapter will discuss the education and health issues which are important in people's lives of the study area. The chapter will furthermore report on the infrastructure including roads, water, energy as well as agriculture in the study area.

3.2. General information about Mudén

Mudén is located to the northwest of Greytown in the midlands of KwaZulu-Natal within the Tugela River basin among the upper Tugela tributaries (Manyakanyaka 1998). It is part of the Umvoti magisterial district and is bounded by Msinga and Weenen magisterial districts (see Figure 3.1). Mudén is socially, economically and politically dependent on these districts. The main farm town for the area is Mudén itself, a small village connected by route R74 to Weenen on the West and to Greytown on the East (le Gal 2002).

The Mooi River provides the main water supply in that area and its tributaries such as Tshekanem, Mhlopheni, Mdumbeni and Mbalane assist the farmers with water (Manyakanyaka 1998). Mudén area is characterised by dry and mountainous land (Manyakanyaka 1998). In this regard, the farms which are not close to the Mooi River are drier as the irrigation water is first used by the nearest farms and further farmers from the river do not get sufficient water (Sinjan 2003).

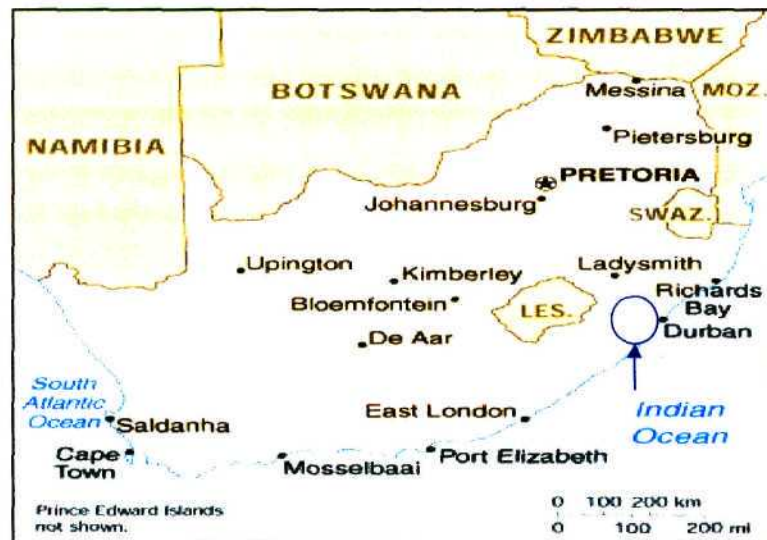


Figure 3.1: Map of South Africa (Sinjan 2003)

Study Area



Figure 3.2: Map of the study area (le Gal, unpublished presentation, UKZN, 2002)

3.3 Climate

According to Manyakanyaka (1998), the Muden area has two climate zones: the first one is the Mist Belt that is cool and humid with a summer rainfall (October-March) between 800 to 1500mm. There is also the Valley region that is warm and dry with rainfall of between 618 and 759 mm. The area is characterised by hailstorms and frost that occur in winter (April-August) and these have a huge impact on the agricultural activities in the area. The area's latitude is between 28° 45' and 29 ° 15'S and its longitude is 30 ° 30' (Manyakanyaka 1998). The area is also characterised generally by hot and dry weather even in summer time (the rainy season), which makes agricultural activities very difficult (Manyakanyaka 1998).

3.4 Soil conditions

There are two kinds of soils in the Muden area: Glenrosa and Shortland (Sinjan 2003). Glenrosa is dark brown with sandy clay loam while the Shortland is moderately deep red with sandy clay (CEAD 1998). According to Manyakanyaka (1998) Shortland soil has a low erosion hazard with a capacity of holding moisture. In this case, the poor condition of the soil is aggravated by the hot, dry climate in the area experienced even during the summer time.

Soil erosion occurs in most of the areas of the district due to poor land management practices (Anon 2003). Particular care needs to be taken to minimize further soil erosion and degradation in the area to avoid any further loss in valuable agricultural soil and to minimise silting of the river (Anon 2003).

Muden is considered to be suitable for grazing or pastoral farming (CEAD 1998). There is vegetation degradation which occurs as a consequence of overgrazing as well as fuel wood collection. However, lack of energy sources for most households has led to the excessive cutting down of trees (Anon 2003).

3.5 Education and health issues

Socio-economic influences are very important for successful farming. Two, education and health are discussed here.

3.5.1 Education

Education plays a meaningful role in the development of the people's lives by freeing them from poverty (Hussein 2002). Muden area does not have senior education facilities and as a result, Muden depends on the adjacent Msinga district for education. More than 68 percent of Muden's population is illiterate and the majority of them are females. This shows a high rate of illiteracy and low skill levels in Muden (Anon 2003). The majority of primary schools are located within rural village settlements and their physical structures are poor, built of wattle and daub rather than of bricks (Anon 2003).

The classrooms are characterised by large numbers of children without enough resources such as desks, books and teachers. Communities initiated most of the schools that later obtained Government grants for upgrading (Anon 2003). There are no tertiary education facilities available in the area and the nearest higher education facilities are in Greytown and Ladysmith (about 25 and 95 kms away respectively) (Anon 2003).

3.5.2 Health

Concerning health issues, Muden has no formal government clinics and it relies on a mobile clinic that visits the area once a month. This serves the rural areas but some of the points served by mobile clinic are not viable as they do not attract the required number of patients (Anon 2003).

In the adjacent Msinga District, there is only one hospital called 'Church of Scotland Hospital' situated at Tugela Ferry (about 40 to 60 kms away from the Mooi River irrigation scheme). It serves the whole Msinga Municipality. It is centrally located and relatively accessible to the majority of the population (Anon 2003).

In the Muden area, there is a high level of HIV/AIDS infection and this results in many orphans in the area. This affects households in different ways: when somebody is sick in a household, medication expenses drain the household economy. In addition because HIV/AIDS is not curable, it requires more time to care for the patient, which affects household activities like farming. HIV/AIDS also affects the overall community as when there are several funerals, people do not have time to do their daily activities (anon 2003).

There is also a high level of gastrointestinal diseases in the area which is caused by the supply of poor quality water (CEAD 1998; Hlongwa 2002). Clean water is a big challenge in the Muden area and from observation there are no taps available; instead people get water from dams and boreholes. These are not cared for as there are plastic bags, paper and other household refuse thrown in the dams and boreholes. When there is no clean water for the community, people's health can be greatly affected. This is worse in the Muden area because there are no available clinics. People in Muden area rely more on traditional healing before going to the hospital. Traditional healers are very respected in the area (CEAD 1998).

3.6 Infrastructure

3.6.1 Roads

It was observed that the roads in Muden area are not in good condition and there is only one main tarred road, R74. The main road is in a good condition but it has a limited reach. The internal roads, which are not tarred, are in poor condition.

3.6.2 Water

The area is subjected to water shortages especially during dry seasons despite the large irrigation potential. During the rainy seasons, people collect run-off water from the roofs of their houses with open plastic drums (Manyakanyaka 1998). During the dry season, people collect water for cooking, washing and irrigation from dams and boreholes which are located in the area. The kind of water that people in the Muden area use is not purified and causes illnesses.

3.6.3 Energy

The people depend mostly on wood for cooking and heating. This is because they do not have access to electricity. They use wood, paraffin or sometimes cow dung for thermal energy (Manyakanyaka 1998).

3.7 Economy and Agriculture

Muden is a poverty stricken area with few economic resources and little economic activity. The little economic activity available is focused towards Greytown (25 km) Dundee (100km) and Ladysmith (95km) (Anon 2003). Government grants for private households generate 29 percent of the income for the area (Anon 2003).

According to Anon (2003), agriculture is one of the most important economic sectors in the district although practiced mainly for subsistence. In addition, the capacity of the land for productive agricultural development is limited due to poor soil quality, adverse climate conditions and poor agricultural practices like overgrazing.

In the area there are small-scale farmers willing to be involved in crop production if the necessary support is provided (Anon 2003). Small-scale farming contributes 18 percent of the income in the area. Approximately 30 percent of the municipal area comprises commercial farmers. Small-scale farming is practiced in the area but it needs to be expanded to become larger operations with more commercial value. This would require farms to be managed more effectively from an agricultural point of view (Anon 2003).

3.8. Description of the Mooi River irrigation scheme

The Mooi River irrigation scheme consists of an open and concrete canal network (Sinjan 2003). The water enters the Mooi River irrigation scheme at Mooi River intake by gravity, and further conveyed to the field canals via the 20 km long main canal (see Figure 3.2). Jeffrey and Scotney (1979) stated that the quality of the Mooi River water was good for agriculture with no indication of salinity or sodicity (salt or alkali) hazards.



Figure 3.3 Distribution of water into the fields

The Mooi River irrigation scheme extends for 600 ha and there are 860 households on the scheme (Sinjan 2003). The irrigation scheme is divided into fifteen unequal farming blocks. Each block has several sluice gates to direct the irrigation water from the main concrete canals along ground channels to the farmers' plots (Sinjan 2003) (see Figure 3.3).

There is a local management committee made of irrigation scheme members, who are expected to control access to the water according to a weekly roster. The committee does not function very effectively. All expenses involved with the irrigation scheme, maintenance of water system and expansion of local dams are born by the provincial Department of Agriculture and Environmental Affairs (Sinjan 2003).

Figure 3.4 reflects a schematic diagramme of the irrigation scheme. However, in reality the blocks vary widely in size and shape. Farmers directed the water from the main and subsidiary canals through ground channels into each cultivated plot. Apparently the chief, in conjunction with the DAEEA allocated the plots to male members of the community in the 1950s when the scheme was commissioned.

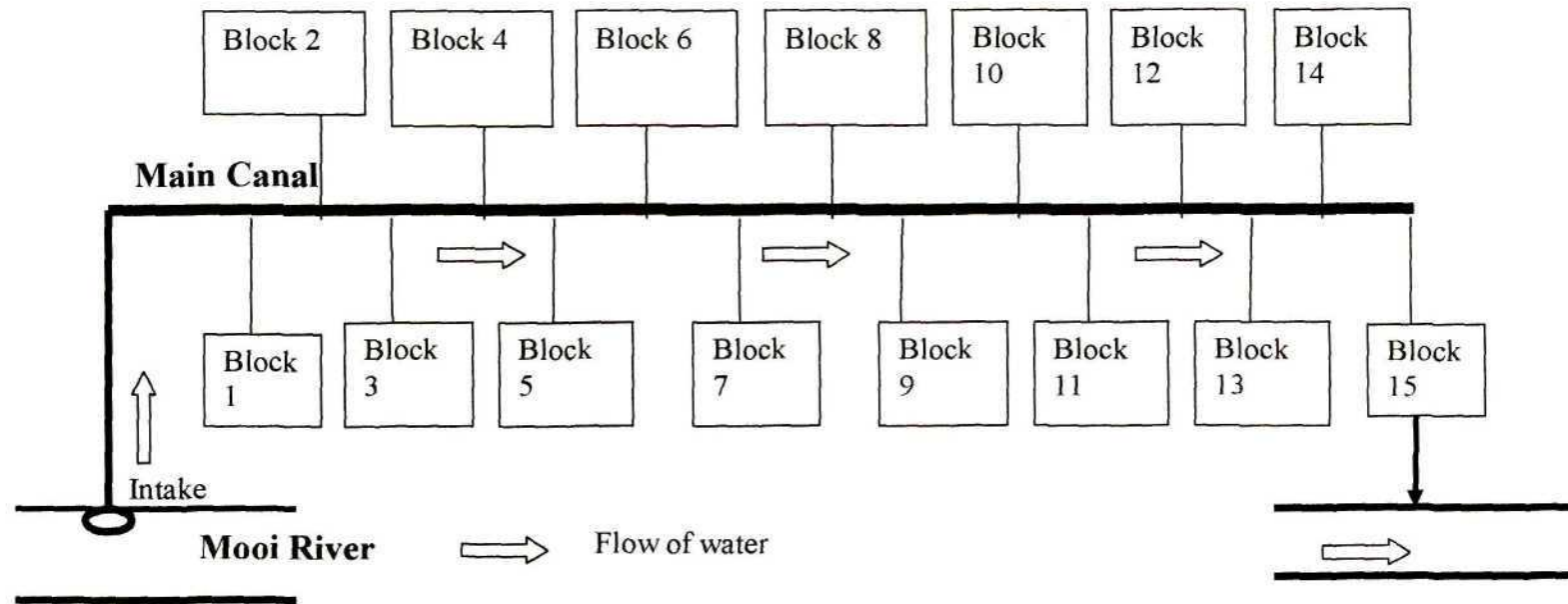


Figure 3.4: Schematic overview of how the Mooi River water is distributed into the blocks on the Mooi River irrigation scheme (Sinjan 2003)

3.9 Summary

This chapter described Muden area, where the study was conducted. It was found that the area has dry and mountainous land and generally the area has problem of water, which becomes a challenge for the agricultural activities.

The chapter showed that the area is characterised by hail storms and frost which affect the farming activities. In addition the weather is not favourable for agricultural activities as it gets hot and drier even in summer time.

The Mooi River irrigation scheme has fifteen blocks and they get water from the Mooi River with sluice gates to direct water from the canal into the sub-canals and from there into the fields.

The management of the scheme relies on a local committee and the DAEA- but does not function very effectively.

CHAPTER 4

METHODOLOGY OF THE STUDY

4.1 Research design

The objective of this study was to investigate the changes in farming and activities of the farmers' association supporting small-scale farmers on the Mooi River irrigation scheme, Muden area. It was important to identify the kind of support that had helped farmers to overcome constraints that limited their farming activities, particularly since a previous baseline survey conducted in 2002. Had the earlier attempt at strengthening the potential support for farming by the farmers' associations had any long-term impact? The study investigated the activities of farmers associations, NGOs and DAEA operating on the Mooi River irrigation scheme and determined the activities that could be done in order to help small-scale farmers overcome the constraints that limited their farming activities.

This chapter describes the research design and methodology selected and used to collect data on the changes in farming and farmers' associations from 2002 to 2005. In addition, this chapter justifies the selection of methodologies used and data collection techniques appropriate for this study.

This research took place amongst small-scale farmers on the Mooi River irrigation scheme over two months, September and October 2005. The area was identified from previous research conducted in 2002 by students from University of KwaZulu-Natal, working with small-scale farmers on the Mooi River irrigation scheme. This motivated the researcher to investigate whether there had been changes in farming and farmers' association activity since the previous research was conducted.

The current study used a household survey followed by focus group discussions which were conducted in a participatory manner. In both data collection methods, sustainable

livelihoods analysis was used in order to assess the sustainability of farmers' livelihoods and the factors that affected their livelihoods. In addition, sustainable livelihood analysis was used to encourage the farmers to identify their assets and to gain insights into relationships between their assets and forces influencing these (DFID 2000).

4.2 Population and sample selection

This study was conducted on a sample of farmers in three blocks: blocks 6, 12 and 15. The blocks had been randomly selected from the 15 blocks of the Mooi River irrigation scheme in 2002. For individual farmer sample selection, the extension officers made the arrangements for a meeting with the farmers from each block selected for this study. This was based on the availability and how ready the farmers were to attend the discussions. In the study area, as was observed from the pilot visit, the farmers' homes were not located close to the farm lands but at some distance away. The extension offices and schools were places in the community where the farmers' meetings took place and the focus group discussions were held.

Sampling of individuals was convenience based (volunteers) with an estimated 25 percent sample of farmers. There were about 207 farmers in the three blocks of whom 52 participated in the study. In this regard, as Weisberg *et al* (1996) agree, when the sampling fraction is 25 percent or above, enough of the population has been sampled so that public attitudes are likely to be similar to those of the sample.

4.3 Survey materials and approaches

A survey was conducted with farmers working in the three blocks. A survey, as Babbie (1992) explains, allows the researcher to collect the original data directly from the participants. In a survey, the prepared questionnaires are administered to the participants in order to answer the questions regarding the research problem (Babbie 1992; Dane 1990). See appendix A for the questionnaire.

The meeting with the farmers from block 6 took place in the office of DAEA's extension officers. The meeting with the farmers from block 12 took place outside the extension office building and the meeting with the farmers from block 15 took place in Khanyisani Hardware store as it was raining and there was no other place available for the meeting (the original venue being under a big shady tree).

While the participants were waiting for all to arrive, the household survey was conducted with individual farmers who were already present. The content of the household survey is described in Section 4.4.1 and Appendix A. The survey was carried out for each block with the assistance of extension officers and a translator. The farmers were happy about the questions and they were very active in answering them. The presence of the researcher during the household survey was important in terms of giving clarity and guidance, where required.

4.4 Data collection techniques

In this study the following data collection techniques were used: household survey by questionnaire, and focus group discussions using a sustainable livelihoods framework, and techniques of priority listing, voting, and action planning.

4.4.1 Household survey

A household survey was used to collect data on demographic details and livelihoods of the sample. (See Appendix A for the Zulu and English questionnaire). A questionnaire in the form of a table was administered to each individual farmer participant. The researcher, the extension officers and the translator helped each farmer to complete the questionnaire by asking questions from the questionnaire in order to assist the participants who were mostly illiterate. In addition, the assistance from the researcher, extension officer and the translator helped the farmers to understand and get clarity about the questions asked in the questionnaire. Furthermore, this was useful for the researcher to make sure that all the questionnaires were completed without any missing information.

Questionnaires that were used in this study were translated from English into Zulu, the local language of the participants. Questionnaires in the participants' local language helped the participants to express themselves and participate freely. Leach (2001) agrees that using a translator in research enables participants to understand and respond in their local language and this can make the participants feel comfortable. A Zulu-speaking student from the University of KwaZulu-Natal translated the questionnaires from English into Zulu. The questionnaires were then retranslated into English for the researcher to compare the two English questionnaires in order to check the accuracy of the translation. As the researcher could not speak Zulu, the same trained translator from the University of KwaZulu-Natal was used to assist in data collection and help conduct the group discussions.

The survey encouraged the farmers to identify, for themselves, their assets in terms of the number of people in a household, their age, educational level, skills, households members' contribution to the farming activities and off-farm income. These assets are considered as human and financial capital in sustainable livelihood analysis technique (de Gruchy 2005). After the household survey, focus group discussion was the next technique to use.

4.4.2 Focus group discussions

A focus group discussion (see Figure 4.1) was an appropriate method to use in this study as it focuses on participants with similar characteristics and knowledge regarding farming activities. A focus group discussion is made up of people with certain common characteristics, similar level of understanding of a topic and is usually a relatively homogeneous group of people (Litoselliti 2003; Frechtling and Westat 1997). Focus group discussions were used in order to help farmers assess their livelihoods, to promote learning and encourage farmers' growth in identifying their assets, constraints and the relationships between assets and forces influencing them (DFID 2000).

The focus group discussion was found to be appropriate in this study as it helped the farmers to interact and remind each other about the issues presented to them. In this regard, interaction is important as it involves participants learning from each other and

reconsidering or re-evaluating their own understandings and experiences (Litoselliti 2003). Group discussion also helps to gain information and to listen to people's views. Group discussion helps participants' opinions to develop and shift as result of discussion (Litoselliti 2003). It is argued that the focus group discussion is the explicit use of the group interaction to generate data and insights that would be unlikely to emerge without the interaction found in a group (Frechtling and Westat 1997). In addition the technique inherently allows observation of group dynamics, discussion, and firsthand insights into the respondents' behaviours, attitudes, and language (Frechtling and Westat 1997).

A focus group discussion was conducted with farmers from each irrigation block. This was found to be appropriate for this study because the participants were all farmers and they shared similar understanding of farming activities (Litoselliti 2003). This helped them to learn from each other and from the process (Frechtling and Westat 1997). In addition focus group discussions helped the participants to interact and discuss the questions presented to them. Focus group discussions also helped the participants to participate in the process by giving their own opinions and listen to others' views (Litoselliti 2003).

The focus group discussions were conducted on weekdays. All the participants were encouraged to speak in order to give each one the chance to voice their opinion. At the end of the meeting, the participants were given a chance to ask questions in order to clarify what had been discussed.

In focus group discussions, the facilitator asked open-ended questions from a prepared topics sheet with the possibility of probing as a result of discussions (Salomon 2002). (See Appendix B). According to De Vos (2002) this is very important as the researcher is able to follow up particular interesting avenues that emerge in the discussion and the people are able to participate by giving a fuller picture. Chambers (2002) has shown that open ended-questions are often presented as core of PLA where a dialogue is regarded as a two-way process of communication. Chambers (2002) adds that these dialogues constitute a very important part of the analytical and learning and in PLA participants

learn something by presenting information (Chambers 2002). This is part of Participatory Learning Action (PLA) where the participants and the researcher dialogue and learn from each other (Chambers 2002).



Figure 4.1: Focus group discussion with the farmers on the Mooi River irrigation scheme

Techniques of Participatory Learning and Action (PLA) were used in order to stimulate the participation and the learning of the farmers in the process. In participatory research, participants are involved in the process of identifying problems and priorities and have considerable control over the related activities of analysis, planning and implementation of solutions (DFID 2000). The PLA methods that were used in this study were focus group discussions guided by sustainable livelihoods framework. According to Chambers (2002), focus groups are often powerful and efficient for PLA. In addition as there are different methods of conducting PLA, Chambers (2002) considers sustainable livelihood analysis as an approach or method of conducting PLA.

The Sustainable Livelihood Analysis approach was used for each focus group discussion in order to encourage participants to participate and learn from the process. This also encouraged farmers' learning and it helped to get consensus. In this process participants'

assets (human, natural, social, physical, and financial assets) as well as institutions that affected their livelihood were identified by the farmers' themselves. In addition the participants were able to identify the constraints that they faced in their farming as well as strategies to take in improving their farming activities.

The priority listing technique was used in each focus group discussion to rank problems, issues or actions (Salomon 2002). In this exercise the participants developed a list of problems, issues or actions, and then they ranked the statements according to what they saw as a priority. In the priority listing technique, the approach of voting by raising hands was used where the total scores for each statement enabled them to be put in order of importance (Salomon 2002).

In addition, action planning technique, which is one of the PLA methods, was used (Salomon 2002). The purpose of this technique was to encourage the participants to identify specific tasks and responsibilities required to achieve a particular objective (Salomon 2002). A table with vision, strategy and plan was developed in action planning technique (see Appendix B). In this exercise, the participants identified what they needed for their farming activities to improve and drew a plan of action on how they would achieve them.

All the answers given were written down on a flip-chart so that the participants could remember what they said. This also helped the researcher not to miss any information given by the participants (Babbie 1992). According to Litoselliti (2003) it is important to write the answers on a flip-chart so that they are visible throughout the session.

As the discussion in this study was conducted in Zulu, the responses obtained from the participants were translated from Zulu into English by the same Zulu-speaking student from the Community Resource Management Programme.

4.5 Data treatment and analysis

The gathered data were meaningfully organized by selecting, focussing, simplifying, abstracting and transforming the data which were written in field notes (Frechtling and Westat 1997). In this case, the data not only became manageable but also organized in relation to the research problem. Frechtling and Westat (1997) argue that common mistakes occur when a large volume of unassimilated and uncategorized data are presented. This is why in order to avoid these mistakes, the researcher decided to check and organize the data gathered.

The data collected from the household survey were then entered into the Statistical Package for the Social Science (SPSS) version 11.5. These data were entered in order to extract descriptive statistics to obtain frequencies, means, modes and ranges.

The data from focus group discussions were also checked and then presented for comparison. Themes were identified in order to find commonalities and differences (Frechtling and Westat 1997).

The researcher re-analyzed the 2002 household survey data which was converted from MS Access to SPSS to be able to compare the two sets of data. After analyzing the data the researcher compared and discussed the results with the current research done in 2005 in order to draw conclusions regarding changes in farming and farmers' association support in terms of the research problem.

4.6 Summary

This chapter set out and justified the methods used in this study. It discussed the research design by restating the aim of the study and how this was carried out. It also discussed the population and sample selection and how this was carried out. In addition, survey materials and approaches used in this study were discussed. This includes the methodology used for data collection and sample selection. Methods for data analysis were discussed. In the next chapter the results and discussions will be presented.

CHAPTER 5

RESULTS AND DISCUSSION

This study aimed at investigating the changes in farming and farmers' association activities in support of small-scale farmers on the Mooi River irrigation scheme, Muden. The study also investigated the activities that farmers' associations, NGOs and the Department of Agriculture and Environmental Affairs (DAEA) had been doing to help small-scale farmers overcome their constraints. This chapter aims at discussing the findings obtained through different data collection techniques utilized in this study.

A household survey was used to examine the demographic details and the sustainability of sample households. This was explored through the identification of household assets in terms of the number of people in a household, their age, gender, educational level, skills, contribution to farming activities and off-farm income.

Focus group discussions were used in order to explore farmers and community resources such as human, natural, social, physical and financial assets. Focus group discussions were also used to identify farmers' assets and help in terms of institutions and their policies. In addition, the discussions were used to identify farmers' constraints to their farming activities as well as actions that could be taken in order to improve farming output and marketing.

In both these data collection methods, the sustainable livelihood analysis was used in order to gain insights into farmer's assets, livelihood sustainability and institutions that affect their farming activities.

5.1 Characteristics of the respondents

The sample comprised small-scale farmers from blocks 6, 12 and 15 that had been randomly selected from the 15 blocks in Mooi River irrigation scheme. For the individual farmers, convenience sampling was used based on the availability and volunteering of farmers. In the three blocks of this study, an average of 25 percent sampling was obtained from the total number (207) of small scale from all three blocks.

In this study, 52 % of those participating were women and 48 % were men. Gender was unexpectedly evenly distributed. The average age of participants was 54 years old. Ages ranged from 27 to 87 years old. This showed that older people were more involved in farming than younger people. In the sampled households, 69 % were households headed by men while 31 % were headed by females.

In sampled households there was a high level of illiteracy. 52 % of household heads did not have basic education (Table 5.1). This fact may have affected the households' livelihoods as education plays an important role in the household improvement in terms of obtaining employment for income (Cousins 2005). Concerning the highest level of education in households surveyed, 39 % of households had someone with Grade 7 -12. High school education is more common amongst children.

Table 5.1 Highest household education level

Highest education level in household	Frequency	Percent
No basic education	27	51.9
Grade 6 and less	5	9.6
Grade 7 to Matric	20	38.5
Total	52	100.0

5.2 Household survey results

The household survey aimed at collecting the demographic details of the sample, the assets that they had in terms of education, skills as well as the involvement in farming activities by the household members (See Appendix A for household survey questionnaire).

Households, as De Stage *et al* (2002) define, are the units of people who eat together, share the resources and live under the same roof. From the 52 households surveyed, the average household size was 5.38 people (SD± 2.7) reflecting a large variability in household size, which ranged from 1 to 14 people. The average number of adults in households was 3.58 while the average number of children per household was 1.81. This shows that there were more adults in the sampled households than children under 18. In addition, the biggest category of households (42 %) had no children present and this shows that perhaps grandparents were no longer automatic carers of grandchildren who may have provided an additional labour pool. This needs to be researched further.

Table 5.2: Chi-square analysis of household size and number of earners

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	75.187	40	.001
Likelihood Ratio	40.275	40	.458
Linear-by-Linear Association	8.338	1	.004
N of Valid Cases	52		

In the sampled households, 46 percent of households received income from off-farm work. This work involved being security guards, drivers, a community health worker, nurse, decorator, bricklayer, cleaner, hospice laundry worker, builder, counsellor, sewer and painter. The Chi-square test (Table 5.2) reflected the significance of the relationship between the number of off-farm workers and the household size and showed that the number of earners rose with household size. In this regard, the P-value was 0.001, which is highly significant.

Many of the households surveyed obtained social grants. About 60 percent of households received grants and many of these households (31 %) received multiple grants. It was shown that receipt of social grants was among farmers' livelihood strategies. Among the social grants that households received were child support grants and social pensions. This reflects that the social grants played an important role in household livelihoods especially because of the low numbers of off-farm workers (46.2 %). To illustrate the role of grants in the livelihood strategies in this sample, there were mostly (22) pensioner grants and this is because the majority of grant recipients had few or no children.

The number of child grants in sampled households depended on the number of children in households. As expected, the Chi-square test shows that there is significance (P- value 0.000) in the relationship between the number of child support grants and the number of children that are in a household. This reflects that the small-scale farmers understood their rights to child grants. The more children that the household had the more child grants were actually obtained. This has an implication for household livelihoods as it increases the income in the household to meet the households' needs. When there is income in a household, it contributes to the improvement in the farming activities because the income can be used to buy seed, to pay labour and to buy equipment for agriculture. This means that getting income in the participants' households can make an important contribution towards farming activities (Mwakalobo 2000; Woodhouse 2002).

Table 5.3 Number of children per household and number of child support grants

The number of children in a household	Number of Child support grants						Total
	0	1	2	3	4	6	
0	20	1	0	1	0	0	22
1	5	1	0	0	0	0	6
2	3	2	2	0	0	0	7
3	5	0	0	1	1	0	7
4	3	0	2	0	0	0	5
5	0	0	0	1	0	0	1
6	1	0	0	0	0	1	2
7	0	0	0	1	0	0	1
9	0	0	0	1	0	0	1
Total	37	4	4	5	1	1	52

Chi Square significance P=0.000

For households, the average total monthly income was R1459 (SD± R1915), with a very wide variation in income and 50 percent of households earned less than R 780 and 50 percent earned more than R 780 (median). The income in households ranged from 0 to R10 360 per month.

It was identified that besides farming as a livelihood strategy, the members of households look for jobs in order to earn a living for their households. In this case, some members worked locally and others worked further away. It was shown that 20 percent of households had migrant workers and 35 percent of households had members who worked locally.

Household members' skills are important in their contribution to the livelihoods of households. In households surveyed, 15 households (29 percent) did not have any members with skills and 14 households (27 percent) had one member with skills. This meant that people considered themselves to have few skills. The skills that were acknowledged in the households were: farming, driving, baking, sewing, craft, building, painting and mechanical skills.

Concerning farming involvement by household members and potential labour on the farms, there were some members of households who were fully involved in farming. Half of the households (26 households; 50 percent) had one member who was fully involved in farming. There were also members of households who were partially involved in farming and in this case, 14 households (27 %) had additional helpers on farm from time to time. In the participants' households, there were also the members who were scarcely involved in farming. About 20 households (38.4 %) reported people who were scarcely involved in farming.

In summary, the household survey shows that mostly men are household heads, that there are fewer children than adults. In the sampled household income varied widely and that 60 percent were grant recipients. In addition, the household survey shows that there were

high levels of illiteracy and there were few skills present in households. Furthermore, the household survey shows that there is on average only one household member fully involved in farming. As expected, this reflects generally poor household situations.

5.3. Focus group discussion results

At the focus group discussions, held with farmers from block 6, 12 and 15, the following description of their farming activities was obtained.

5.3.1 Description of the farming system

A farming system includes aspects of inputs, throughputs and outputs (FAO 2002). The farming systems from block 6, 12 and 15 will be discussed in terms of land, crops, equipment and livestock. In this study, focus group discussions identified farmers' assets, and support in relation to institutions.

Focus group discussions also identified the constraints that farmers experienced in their farming activities as well as the plans of action that they could take in order to reduce those constraints and increase their farming outputs. Aspects of sustainable livelihoods framework were used in order to guide the discussions and these results will be given later in the chapter.

5.3.1.1 The land

The focus group discussions identified that the participants owned their land which was important for the farmers (see Figure 5.2). Though individual tenure was not legal, it was secure. The participants had multiple plots of land including owned and rented.

In this study an average of 2 plots per person were rented while an average of 4.5 plots of land per person were owned. This shows that each participant had more than one plot of land for agricultural activities and this allowed them to grow a variety of crops. No one

complained about lack of land and it seemed that the participants were satisfied with the plots of the land that they had.



Figure 5.1: Plots of land for small-scale farmer

5.3.1.2 The crops grown

Small-scale farmers grew a variety of different crops in order to maximize food availability and money. The participants on the Mooi River irrigation scheme also grew various crops. They sold some of the crops and they used them for own household consumption.

The vegetables grown by participants from block 6 are listed in Table 5.4.

Tomatoes were the most important crop to grow in block 6 as they gave more profit when selling them. Ninety- four percent of the participants in block 6 grew tomatoes. Tomatoes were sold at R60 per crate of 30 kg (See Table 5.4). The second most important crop that the participants from block 6 identified was chillies and it was also considered very profitable. A quarter (25 %) of participants grew chillies and they sold it for R25 per 5 kg. The third most important crop that the farmer participants grew was potatoes and they

were grown by 63 percent of participants in block 6. The potatoes were considered by the participants to be in high demand which was the reason the participants grew them. They were sold for between R15 and R20 per pocket of 10 kg. Butternut was considered the fourth most important crop and 56 percent farmers grew butternut and they considered it to be in demand. The selling price of butternut was between R15 and R20 for 10 kg pocket. Green pepper was the fifth most important crop and 44 percent grew green peppers and sold it for R30 per crate of 20 kg. The farmers sold their produce mostly to local people and to the hawkers.

Table 5.4. Crops grown and the price obtained from sales (blocks 6, 12 and 15)

Crops grown	Price sold (R)		
	Block 6	Block 12	Block 15
Tomatoes	R60/ 30 kg crate ***	R 60/ 30kg crate ***	R60/ 20 litre crate *
Chillies	R25/ 5kg **	-	R16/5kg
Potatoes	R15-25/ 10 kg pocket *	R20/10 kg pocket**	20/10kg pocket **
Butternuts	R15-20/ 10 kg	-	R16/ 10 kg
Green pepper	R30/ 20 kg crate	-	-
Beans	R30/ 5 litres	R20-R30/ 5 litres	R25/ 5 litres
Sweet potatoes	R20/ 15 kg	-	-
Soya	R6/ a bottle	-	-
Carrots	R5/ bunch of 10-12 carrots	-	-
Cabbage	R2.50 to 4/ head	R3/ head	R2/ head
Onions	R20/ 10 kg	-	R14/ 10 kg
Beetroot	R3.50/ 4-6 roots	-	-
Garlic	R30/ 10 kg	R34/10 kg	R35/5kg
Sweet peas	R5/ 5 litres	-	-
Green Beans	R2.50/ 1 kg	-	-
Green mealies	R3/ 4 cobs	-	50 cents /1 cob ***
Maize	-	R10-20/ 5 litres *	-
Spinach	R4/ a big bunch	R3/ a bunch	-
Lettuce	R2/ a small bunch	-	-

*** most important crop

** next most important crop

* third most important crop

The farmers in block 6 also grew other less important crops as listed below:

- Beans were sold R30 per 5 litres
- Sweet potatoes were sold R20 per 15 kg

- Soya milk was sold R6 for a bottle
- Carrots were sold R5 for a small bunch of 10 to 12 carrots
- Cabbage was sold R2.50 to R 4 per head
- Onions were sold and 10 kg are sold for R20
- Beetroot was sold R3.50 for 4 to 6 roots
- Garlic was sold R30 for 50 kg
- Sweet peas were sold R5 for 5 litres
- Green beans were sold R2.50 for 1kg
- Green mealies were sold R3 for 4 cobs
- Spinach was sold R4 for a big bunch of spinach.
- Lettuce and they sold them R2 for a small bunch.

The farmers in block 12 also grew a number of crops (see Table 5.4).

- Tomatoes were regarded to be the most important crop as they provided more profit to the farmers. Forty-five percent of the farmers in block 12 grew tomatoes and they were sold R60 per 5 litre crate.
- Potatoes were the second most important crop and 69 percent of the farmers grew potatoes. They sold them for R20 per 10 kg pocket of potatoes.
- Maize was the third most important and 76 percent of the participants grew it. It was sold for R10 to R 12 per 5 litres and it was sold decobbed. The farmers also mentioned that they sold green maize at R3 for 4 green mealies.
- Beans were the fourth most important crop and 93 percent of the farmers grew beans. The farmers sold the beans for R20 to R30 per 5 litres.
- Garlic was the fifth most important crop and 34 percent of the participants grew it. They sold garlic at R 35 for 10 kg.
- Cabbage was the sixth most important crop. Seven percent of the farmers grew cabbage and they sold it for R 3 per head.
- Spinach was also reported to be grown by the participants and 14 percent of the participants grew it. It was sold for R3 for a bunch.

The farmers sold their produce mostly to the local people and also to some outsiders especially Indian traders who came to the farms to buy.

The farmers in block 15 grew different crops:

- Maize was the best crop to grow and 86 percent of the farmer participants grew it. Maize was sold for 50 cents for one cob.
- The farmers also grew potatoes and 86 percent of the farmer participants grew them. Potatoes were sold at R20 for 10 kg.
- The third most important crop was tomatoes and it was reported that 43 percent of the farmer participants grew them. Tomatoes were sold at R60 for a 20 litre crate.
- Beans were also important and 57 percent of the farmers grew beans. They sold them for R25 for 5 litres.
- Garlic was also important and 43 percent of the participants grew garlic which they sold at R35 for 5 kg.
- Onions were also important and 57 percent of the farmer participants grew onions. They sold them for R14 for 10 kg.
- Butternut was also grown and 14 percent of the participants grew it. They sold them at R16 for 10kg.
- Cabbage was also grown and 29 percent of the participants grew cabbage which was sold for R2 per head.
- Pepper was also grown and 14 percent of the participants grew pepper which and they sold at R16 for 5 kg.

These farmers sold their produce in Greytown, which is the nearest town from the farmers' farms in block 15. The farmers also sold their produce to the hawkers who came to the farms to buy their produce. The farmers mentioned that they sold garlic in Pietermaritzburg and in Durban.

Looking at the crops grown and sold from the three blocks, it was identified that block 6 grew more crops than the other two blocks. Among the three blocks, block 12 seemed to grow fewest crops. Chillies, butternut, green mealies, onion, were grown by farmers in both block 6 and 15. Green pepper, sweet potatoes, soya, carrot, beet root, sweet peas and lettuces were the extra crops grown by the farmers in block 6. It is important to grow a variety of crops as they increase the opportunities for income and food availability. This also reduces risk of crop failure (Manyakanyaka 1998).

The changes in crop production since 2002 are discussed later in section 5.5.2.

5.3.1.3 The equipment

In order for farming activities to be successful, farmers needed equipment. Since 2002, about 31 percent of the farmer participants had purchased new hoes. About a third (31 %) managed to get new pangas and about 32.6 percent managed to get new spades. About 34.6 percent managed to obtain garden forks, 34.6 percent bought new sickles, and 32.6 percent got new watering cans. Other equipment such as tractors and trucks were hired from local people. A few (19.2 %) of the participants bought new bush knives and 2 percent of the participants had bought new sprayers for weedicide application.

There were some changes in terms of farming equipment since 2002 up to 2005. In 2002, the majority of the farmer participants reported owning no equipment (98.6 %) while 1.4 percent had only a sprayer. This shows that between 2002 and 2005 farmers obtained new hoes, pangas, spades, forks, sickles, bush knives, sprayers and watering cans. Some were purchased, but others were provided by DAEA (numbers were not identified).

5.3.1.4 The livestock

Participants from blocks 6, 12 and 15 reported that they owned livestock and these contributed to their livelihoods (See Table 5.5). When asked to report the livestock acquired since 2002, farmers reported that there were 133 more goats. These played an important role for the farmers and their farming activities. Goats produced milk, meat,

skin, and income when they sold these items. The goats were also useful in providing manure to make the soil fertile. The goats were also used for ritual activities and celebrations.

In addition, the farmer participants reported 52 extra cattle since 2002. Cattle were useful in producing milk and meat for sale, generating income and also as food in order for the farmers to be healthy and strong. The cows were also useful for providing skin for traditional purposes and manure to use in their fields. Manure was useful for the farmers especially because the farmers did not have means to buy fertiliser. So manure from the livestock was important to them in order to make the soil fertile. In addition the cows were used for women's lobola payments (bride price) and their hides for traditional shields.

The farmers mentioned that since 2002 they felt that they had about 48 more chickens, which were used for meat and income when sold. Chickens also gave manure and eggs. The farmers reported that the dogs, because of a lack of chicken houses, ate the eggs. Many chickens (number not known) had been slaughtered since 2002. The farmers had acquired 25 turkeys which were used to get income and for meat. The farmers also reported that they had one donkey that was used for ploughing and for transporting goods. However, they mentioned that many animals had died from drought and slaughtering for food.

Table 5.5 Livestock acquired in blocks 6, 12 and 15 on the Mooi River irrigation scheme since 2002

Blocks	The number of livestock				
	Goats	Cattle	Chickens	Turkeys	Donkeys
6	105	22	39	25	0
12	14	25	8	0	0
15	14	5	1	0	1
Total	133	52	48	25	1

5.4 The Sustainable Livelihoods Analysis results

As mentioned previously, aspects of the sustainable livelihood analysis were used in order to identify the assets that the farmers had and which contributed to their farming activities. In addition part of sustainable livelihood analysis was used to identify the opportunities that the farmers had in order to minimize their constraints and to improve their farming production and what support or help had been available to the farmers.

5.4.1 The capital of the participants on the Mooi River irrigation scheme

The participants on the Mooi River irrigation scheme had different capitals or assets which helped them in their farming activities. Information summarized in Table 5.5 illustrates the capital of the participants.

Table 5.6 Capitals (assets) of the participants in blocks 6, 12 and 15 on the Mooi River irrigation scheme as identified by the farmers.

Human capital	Social capital	Natural capital	Physical capital	Financial capital
Education in the households	Members of the households	Land	Crops	Social grants
Skills (farming, driving, baking, sewing, craft, building and painting)	Extension officers	Trees	Equipment	Household income
	Buyers	Sun	Livestock	
		Moon	Roads	
		Water, river	Markets	
		Rain	Buildings (extension offices, hardware store and schools)	

In the participants' households, there were different capitals and they played a meaningful role in farmers' livelihoods. There was human capital that included education of the members of the households. Education is described by DFID (2000) as a human

asset. This could contribute to the farming activities as when the members in a household are educated they contribute in terms of knowledge and income as they become employed. In this way education is very necessary and it is needed for small-scale farmers in order to be able to better manage their farming activities (Ozowa 1995).

Another human capital was the skills present in participants' households such as farming, driving, baking, sewing, craft, building and painting. These skills are important as they could generate more income for the households or be used for maintenance of current assets.

The participants had social capital, which included members of their households in their contribution to farming activities. This in fact contributed to the farming activities in terms of labour. In small-scale farming, family labour plays a very important role (DFID 2002). Another social capital of the participants was the extension officers who were assisting the farmers. In addition, the participants had the buyers who bought the farmers' produce.

The participants had natural capital. Plots of land for farming were identified by participants. Land is an asset that is very important in farming activities (DFID 2000). There were also trees, sun, moon, water, river, rain which were also identified as natural assets and which were useful for the farmers in their farming activities.

There was also physical capital. The participants had crops, which provided food for farmers' health and income when they sold them. The farmers had also equipment to use in their farming activities as without the equipment farmers could only farm with difficulty. Another capital for the farmers was their livestock. The farmers on the Mooi River irrigation scheme had public roads, though some were not in a good condition especially in the rainy season, but the roads were useful for the farmers. The roads allowed the farmers to move from their community to the markets to sell their produce and also roads allowed the buyers to reach the farmers. There were also some buildings mentioned, such as extension office buildings where meetings were held and shops with

their supplies as well as schools that were useful for the farmers' meetings and other important activities (DFID 2000).

The farmers had also financial capital and this included social grants and households' income, which helped the farmers in their livelihoods. These were reported in Section 5.2.

5.4.2 The farmers' vulnerability context

The sustainable livelihood analysis shows that in the participants' vulnerability context, constraints limited them in their farming activities. These prevented the farmers from improving their farming production. The farmers' vulnerability context consists of: water, livestock, weather and money as described below.

- Shortage of water for irrigation was the major problem for all the farming blocks. There were four dams for water harvesting but they never become full enough for the farmers to be able to irrigate their crops. In addition the farmers mentioned that the irrigation schedule for the canals was not followed as there were some farmers who irrigated their fields at others' times. Lack of water is usually a major problem for all small-scale farmers (Earth Report, undated) and this affects their agricultural production. Even on the irrigation scheme, earlier blocks received more water and later blocks were dry.
- Another constraint that the farmers mentioned was the goats which went into their fields and destroyed their crops. This happened due to lack of fencing.
- Thunder and lightning and lack of insurance on the case of loss of their produce were other constraints for the participants. There were also droughts, and frost which destroyed the crops. As was mentioned in the literature, small-scale farmers in South Africa face similar problems of droughts, floods, hail storms, and frosts, which reduce agricultural productivity (Moeti 2005).

- Lack of money was also regarded as a concern for the farmer participants. This in fact limited them in buying the needed inputs of equipment, hiring a tractor and fencing their gardens. From literature, lack of capital is a major problem for all small-scale farmers (Moyo 2002).

5.4.3 Support from institutions that the participants received

The participants reported that there were institutions, which assisted them in their farming activities with a variety of support. These include two farmers' associations, provincial agriculture department, municipality, commercial companies and NGOs.

- '*Impumelero*' which was a farmers' association that assisted the farmers with poultry projects and trained them to make traditional mats for sale in order to earn an income. It also trained the farmers in alternative livelihoods strategies such as sewing and cookery in order for them to generate incomes. Once income was generated could be used to meet household needs as well as used to buy agricultural inputs. These could minimize the constraints and improve the farming outputs. The '*Impumelero*' association was newly formed and consisted of 5 farmers from block 6. There were expecting more members to join.
- '*Tembalethu*' was made by 80 farmers, 16 members of which were present in this study. '*Tembalethu*' assisted the farmers in terms of giving them guidance and advice for their farming activities. Guidance and advice are very important and highly needed by small-scale farmers as Whiteside (1998) and Ozowa (1995) argue, especially when the farmers are not educated, as it was the case in this study where there were high levels of illiteracy among the farmers.
- Provincial Department of Agriculture and Environmental Affairs (DAEA) as an institution assisted them in their farming. The DAEA assisted the farmers with extension services and trained them to organize for the benefit of their farming activities. From literature, extension services and training are among the

important needs for small-scale-farmers (Hlongwa 2002). The DAEA assisted a few farmers with chicken projects by building and fencing the chicken houses and bought them chicken feeding equipment. This was important as the farmers could generate income from chicken projects by selling live chickens, and products (eggs and meat).

The farmers also mentioned that the DAEA assisted them with irrigation pumps. Water is among the priority things that the farmers said they needed because without it all their activities became meaningless. As it was observed on the Mooi River irrigation scheme, there is still much work need to be done regarding water as the farmers still complain about the shortage of water because farmers closer to the beginning of the scheme tapped too much water. DAEA was responsible for the maintenance and control of the management committee on the irrigation scheme.

- The local municipality assisted the farmers to get fencing. Though some farmers received fencing, but they were still complaining about lack of fencing as animals got into their gardens and destroyed their crops.
- The '*Pannar Seed*' company assisted the participants in block 6 to order seed and delivered it to them. As Swanson and Samy (2002) have shown, the multinational seed and chemical companies have become important contributors to agriculture. Lack of seed is among the constraints, which limit small-scale farmers. Having support from this company could contribute meaningfully to the farmer participants in Mooi River irrigation scheme as good quality seeds could be obtained and delivered to the farmers association.
- '*Vuka Ibambe*' which assisted the farmers in their farming. The farmers did not mention what kind of farming assistance they obtained through this association.
- Agro-chemical company assisted the farmers on the farmers' day at the agriculture office (the kind of assistance they obtained was not mentioned).

- ‘LIMA’ (Rural development Foundation) and Farmer Support Group (both NGOs) assisted the farmers with creating constitutions for their farmers associations. This shows that the participants on the Mooi River irrigation scheme had obtained some assistance. However they complained that DAEA no longer helped them with farming “like in previous times”.

Table 5.7 Institutions that have assisted the farmers on the irrigation scheme since 2002

Blocks	Institution	Type	Support
Block 6	Impumelero	Farmers’ association	Poultry projects Training for skills
Block 6	Tembaletu	Farmers’ association	Guidance Advice
Blocks 6, 12,15	DAEA	Government	Extension office services Training Chicken projects Water
Block 12	Municipality	Government	Fencing
Blocks 6, 15	Pannar seed	Business	Seed
Block 12	Vuka Ibambe	Farmers’ association	Assistance in farming
Block 15	Agrochemistry company	Business	Assistance on the farmers’ day
Block 15	Lima and FSG	NGO	Constitution for farmers’ associations

This section showed that small-scale farmers on the Mooi river irrigation scheme received support from institutions. The support received was important as they could contribute to the improvement of the farmers’ activities. However, most of the information provided was hearsay and therefore scanty.

Block 12 was most unaware of what help was available and had a very poorly functioning farmers’ association. Blocks 6 and 15, which were closer to the exit roads from the scheme, were more aware of potential services on offer.

5.4.4 The participants' plans of action

In this study, the participants were asked to draw plans of action in order to minimize their constraints and improve their farming outputs. However, very little detail to support these plans could be provided by the farmers. Plans of actions were suggested as follows:

Block 6: The participants from block 6 planned to obtain funding in order to buy fencing material, a tractor and seeds. This would be done through the borrowing strategy where the farmers could borrow cash in phases and then paid back slowly after selling their produce. This was a very encouraging plan of action though the farmers did not mention from where they would borrow money. Funds are among the first needed issues for farming and unfortunately small-scale farmers still face the challenge of obtaining cash (Moyo 2002). Finance is greatly needed for small-scale farmers to be able to farm and once obtained, great changes can occur.

Leadership training was also an important need expressed by the farmers in order to minimize their constraints, improve their outputs, to manage their farming activities and the projects. Not only is leadership training important for small-scale farmers but also training in general was requested, where the farmers can be trained in different issues such as market information and technology.

Block 6 and 12: The value of constitutions to farmers' associations equalled efficient production. However, the farmers, especially in block 12 did not use their farmer associations' constitutions properly and ignored them. They realised that this was important as it could help the farmers to be organized and have guidelines to follow in order to make their farming more successful. Block 6 farmers association was better managed but improvement was still sought.

Block 12: The farmers in block 12 planned to attend agricultural local meetings in order to know what was happening with other farmers, to learn and network as well as to be known by the supporting institutions. This was going to be an important plan because

meeting with other farmers was necessary. This could help them to learn from other farmers and be exposed to what they did.

Obtaining fence gates, which could be opened and closed was also among the important plans made by the farmers in block 12. This would prevent animals especially goats from getting into the gardens and destroying the crops.

The participants from block 12 planned to apply to DAEA for more dams, sprinkler systems and water pumps to get more water to irrigate their plots. They suggested a strategy to pay for the cost when the necessary items had arrived in their area. The farmers planned to ask the DAEA for a water pump to fill in their dams as four of them were always dry.

Block 6 and 15: The participants in block 6 and 15 planned to obtain a tractor and hire it out in order to get money to pay the driver. No further detail could be obtained. Very few tractors (the number not known) were available for hire, so when ploughing season arrived, many farmers had to wait for their turn and thereby missing the right time for planting. A tractor plays a significant role for small-scale farmers as it made the work easier and quicker for them rather than using hand-hoes which required more energy and time. This was a challenge for the farmers especially because of their age. They showed that they did not have energy for heavy work. Obtaining a tractor could be a great benefit for them because small-scale farmers usually do not have easy access to modern technology including tractor.

Block 6, 12 and 15: The participants planned to find a place where they could establish a market to sell their produce. This would be done by asking their extension officers to go to the DAEA to find them a place where they could sell their produce. The farmers decided to re-establish the management of a pack house as a loading point to markets. The nearest packhouse at Msinga (22-32 kms away) was generally not known to the farmers. Having a market to sell the produce is needed but markets for small-scale farmers are generally weak and would need to be strengthened.

Block 15: The participants from block 15 planned to approach the municipality for water pumps and fencing. The farmers also decided to pray and make more dams because of the big problem of shortage of water. They also committed to follow the irrigation schedule more diligently so that they would share the available water more fairly. These are important plans of action. However, almost all suggestions relied upon other peoples' actions. They were also unaware (especially in block 12), of how to access DAEA project funding. In fact, they could not understand why just asking orally was not an acceptable process. The DAEA explained their procedures to facilitate the process.

The farmers felt that marketing was less important until they could produce more: increasing yields through water, seeds and fence improvements would provide greater benefits. Thereafter they would concentrate on improving market accessibility.

The above section showed that farmers in similar settings do not have the same knowledge.

5.4.5 The recommendations made in the 2002 study

After the research done in 2002 on the Mooi River irrigation scheme near Muden, recommendations were made in order to improve farmers' farming activities (Le Gal 2002). The recommendations made in 2002 were:

- Implementation of a health policy so that farmers' health could be improved and cared for.
- The development of cash crops which can bring more money to attract young people into farming. This was because young people were not interested in agricultural activities as was the case with older people.
- The introduction of a new land tenure policy because the sizes of available land needed to be improved.

- There should be greater involvement of block committees and also that the water should be paid for to help manage the irrigation system. These recommendations were made because in 2002, it was reported that there was poor coordination of water management on the irrigation scheme. The reason for this was lack of maintenance, conflicts between upstream and down stream blocks as well as water shortage and wastage.
- There should be establishment of a micro-credit system on the Mooi River irrigation scheme. This was needed in order to help the farmers who always faced the difficulty of accessing inputs.
- Collective organization of inputs, supply and marketing. This was recommended so that the farmers could negotiate favourable access to inputs and that the farmers could sell their produce to the markets.
- Improvement of technical assistance, especially from the DAEA. This was needed in order to improve knowledge and information of the farmers.
- The enhancement of block committees with more responsibilities and involvement. This was needed in order to help blocks to be better organized and function properly.
- The relationship between public bodies, communities and farmers' committees needed to be enhanced. There should also be partnerships with the adjacent commercial farmers.

5.5 Sub-problem One: To determine the changes reported by small-scale farmers and farmers' associations since 2002 regarding their farming production and marketing.

Sub-problem one aims at determining the changes which occurred in farming in block 6, 12 and 15 on the Mooi River irrigation scheme in Muden area. In order to assess the changes in small-scale farming on the Mooi River irrigation scheme, the researcher referred back to the farmers' situation in 2002. These changes include: household size, the age of participants, the number of females and males, education, non-farming skills, labour availability, incomes, land, crops, markets, equipment and changes in livestock.

5.5.1 The changes at household level and the impact on the farming: data from the 2005 household survey to the 2002 survey of 190 farmers.

The changes, which occurred in farmers' households (see Table 5.7) could have an impact on the farming in minimizing the farmers' constraints or increasing them (Msiska and Chibambo 2002). The farmers were asked specifically how their farming had changed since 2002.

Concerning the changes that occurred since 2002, it was reported that there had been changes in farmers' household size. In 2002 the average family size was 6.8 members (the mean) while in 2005 the average family size was 5.38 members. This shows that there was a decrease in household size. The fact that household size may have decreased through HIV/AIDS might affect the family labour, as it is known that for small-scale farmers, family labour is important (Chancellor, undated). As shown in the literature review, HIV/AIDS affects small-scale farmers when members of the households die as a result of this disease (Nieuwoudt and Groenewald 2003; ITDG 2005a).

Concerning the changes in age of the participants, in 2002 the average age was 62 while in 2005 the average age was 54 years old. This shows that there was a trend towards slightly younger farmers. This reflects though that from 2002 to 2005 young people were still not involved in farming activities, and it seemed that farming was mostly done by

older people. This affects the farming activities as older people who are weaker and less educated than young people are the ones who are more involved in farming.

Table 5.8: The household changes since 2002 (blocks 6, 12 and 15) on the Mooi River irrigation scheme

Positive changes	Negative changes	No changes	Impact on Farming
-	Household size smaller	-	Family labour less
-	-	No young people in farming	No strong people No educated people
-	-	Women were more involved than men	The availability of time for farming would be reduced Gender bias
-	-	Illiteracy among farmers	Lack of educated people in farming to improve small-scale farming
More farmers skills	-	-	Job opportunities for income generation
Increase in the involvement in farming	-	-	Family labour increased, augmenting amount of land able to be farmed
-	-	The number of off-farm workers	Lack of income buy inputs
The number of people who worked locally	-	-	Availability for farming part-time

The changes regarding the number of female and male farmers, there was little change from 2002 (female 51%; and male 49%). And in 2005 the number of females was marginally higher (52 %) than male farmers (48 %). The speculation for this is that females were still more involved in farming and males migrated to look for work. This might have an impact on farming activities as women who are involved with other household responsibilities also are involved in farming activities. This might make farming activities become less important as women also had other household activities to take care of, and this might reduce their involvement in farming and this research.

Regarding the issue of gender which is common in African societies, farming activities are affected as there is still some bias concerning women's involvement in agriculture such as men own the land and large livestock.

For the participants on the Mooi River irrigation scheme, education of the farmers was still a challenge. In fact, as Ozowa (1995) shows, education in small-scale farmers is important in order for them to be able to conduct farming activities meaningfully. Since 2002, there had been no improvement in small-scale farmers' education. In 2002 about 36 percent of the farmers did not have any education while in 2005 about 52 percent of the farmers did not have any education. This shows that the situation of farmers' education had worsened by 2005. Lack of education affects farming activities as without it farmers can not read information, they can not use the farming instructions appropriately and they cannot use modern technology efficiently in order to improve farming activities (Ozowa 1995).

Concerning non-farming skills among small-scale farmers on the Mooi River irrigation scheme, the 2005 survey shows that there was a change since 2002. In 2002 about 93.7 percent of the farmers did not acknowledge any skills and this percentage was reduced where in 2005 when only 28.8 percent felt they had no skills and 26.9 percent had one skill. This shows that there had been some improvement. Having skills is very important as it can help the farmers become involved in other activities in order to earn income, to improve their farming activities and meet household needs. The cause of this change was not understood and should be investigated further.

5.5.2 Changes in farming involvement and the impact on farming

This section considers changes that occurred in labour availability, incomes, land and crops.

Labour availability: There had been changes in participants' own farming involvement on the Mooi River irrigation scheme. Table 5.8 shows how the involvement in farming changed since 2002.

It is important for the members of the households to be involved in farming activities. On the Mooi River irrigation scheme, it was found that in 2002, about 16 percent of households had people who were fully involved in farming and about 14.5 percent of households had people who were partly involved in farming activities and 20.8 percent had people who were scarcely involved in farming. The remainder (48.7%), it is assumed did not farm at all.

In 2005, half of households (50%) had one person fully involved in farming and 27 percent had helpers on the farm from time to time. About 23 percent of the households had people who were scarcely involved in farming. The results show that more household members became fully involved in farming by 2005.

Incomes: Concerning the changes that occurred in farming on the Mooi River since 2002, it is important to assess how off-farm activities or employment performed as they contribute to the farming activities in terms of income to use for farming. It was reported that there were no changes in off-farm activities in households since 2002. In fact, in both 2002 and 2005, 53 percent of the households did not have any off-farm activities. This reflects that on the Mooi River irrigation scheme the problem of unemployment did not change for the better. Off-farm activities are very important for the small-scale farmers who usually face the challenge of lacking capital and finances for their farming and security of steady income because of farming's seasonality.

There were changes in the number of the household members who worked locally. In 2002 about 12.6 percent of households had members who worked locally and this changed in 2005 where 35 percent of the households had people who worked locally. This could mean that there might be some additional newly created jobs inside the community and that migration of people was less necessary. This is important when the members of the family work locally as they can be available for farming activities and contribute in terms of labour, advice and providing money to meet the farm's needs.

Land: Concerning land for farming, there were changes in the number of plots of land owned by the farmers. In 2002 the average owned land was 5 plots while in 2005 the average of owned plots was 4.5. This shows that there was a little change in obtaining or possibly needing more plots of land.

Crops: There were few changes in crops grown between 2002 and 2005. The main crops grown in 2002 were maize, beans, garlic, potatoes, onions, green maize and chillies. These were still grown in 2005 and were considered important crops. However, tomatoes were now a new crop and considered to bring in good profits.

Some changes occurred also in terms of selling crops for income:

- **Garlic:** In 2002 it was reported that 89% of farmers sold garlic which was considered as a cash crop. This changed in 2005 where garlic was not sold by many farmers, and it was not considered more important than the other crops. About 25% of the farmer participants sold garlic in 2005. This shows that there was a decline in selling garlic as a cash crop.
- **Potatoes:** It was reported that there were some changes in selling potatoes as the number of those who sold them increased in 2005. Around 60% of the participants in 2002 sold potatoes while they increased to 69% in 2005.
- **Onions:** In 2002, 45 % farmers sold onions while in 2005 it was 8 % farmers who sold onions.
- **Tomatoes:** The number of farmers who sold tomatoes increased to 59 % of the participants in 2005, while in 2002, 35 % of people sold tomatoes.
- **Maize:** More farmers sold maize in 2005. Fifty-three (53) percent of farmers sold maize in 2005 while in 2002 about 25 percent of farmers sold maize.

Markets: Concerning the changes in markets, in 2002 farmers sold their produce to local people, hawkers, Indian traders and to the local supermarket. In 2005 the farmers still sold their produce to the local people, Indian traders, to the hawkers and they sold a little produce in Greytown, Pietermaritzburg and Durban using taxis as a way of transporting the produce. They did not sell their produce to the supermarket. The supermarket was not mentioned in the 2005 survey. This reflects that the farmers' local market outlets declined slightly but at the same time became more widespread. Markets are a problem for small-scale farmers and as explained in the literature review, lack of market greatly affects small-scale farmers and reduces their potential improvements for farming (Tkavarasha and Jayne 2004).

Equipment: The participants reported a big change in equipment since 2002. In 2002, 98.6 percent of the participants had no equipment and only 1.4 percent had sprayers. In 2005 about 31 percent of the farmers had new hoes, 31 percent had new pangas, 32.6 percent new spades, 34.6 percent garden forks, 34 percent had new sickles, 32.6 percent had new watering cans, 19.2 percent had new bush knives and 2 percent bought new sprayers. It is presumed that DAEA had helped by providing hand tools.

Modern large-scale equipment such as tractors, trucks and water pump motors were still lacking in 2005 as there was no farmer who owned these. It is important then for the new large technology to be introduced so that they can improve their farming productivity and marketing, but with it should go training and maintenance support. Small-scale farmers still lack modern equipment and this affects their activities. For example, using hand hoes can take a long time for farmers to plough their fields while a tractor can save time and energy for other activities (FAO 2001).

Livestock: It was reported by the farmers that there had been changes in their livestock since 2002. According to the farmers, the number of livestock has decreased since 2002 and this was caused by the drought as there was little for animals to eat.

The farmers reported that they had more livestock in 2002 than now. In 2002, the participants (207) on the Mooi River irrigation scheme had a total of 219 cattle, 606 goats, 31 donkeys, 1 pig and 93 chickens. In 2005 the participants reported that they had 52 extra cattle, and 133 goats, and 48 chickens. In 2005 the farmers also had 25 turkeys and only 1 donkey. The implication of the fewer numbers of animals would be lack of manure for the fields and also lack income from selling animals to buy inputs. Donkeys had died in the drought. The farmers did not provide detailed information about the changes in livestock.

Table 5.9 shows the changes, which occurred in farming on the Mooi River irrigation scheme. These include positive, negative and no changes as well as their possible impact on the farming.

Table 5.9: The changes which occurred in farming on the Mooi River irrigation scheme (Blocks 6, 12 and 15)

Positive changes	Negative changes	No changes	Impact on farming
-	Slight decrease in number of plots farmed	-	Decrease the crop to grow
-	-	Off-farm activities	Lack of income to use in farming
More tomatoes, potatoes and maize sold	-	-	More income
-	Decrease in cash crop of garlic	-	Less income
-	Markets decreased in number	-	Lack of income
More equipment	-	-	More work done
-	-	No modern equipment	Production unchanged and inefficient
-	Livestock numbers decreased	-	Less income Lack of manure Lack of animal protein in diet

5.5.3 Summary of changes which occurred on the Mooi River irrigation scheme

Concerning the changes that occurred in small-scale farming on the Mooi River irrigation scheme, it was clear that there were few major changes in small-scale farming. There were more negative changes, which reflected a worsening situation in 2005. There was a large drop in livestock with significant effects on households. There were also the cases where there were no changes at all since 2002; such as no young people in farming, illiteracy among farmers, the number of off-farm workers and no modern equipment.

This indicates that the small-scale farmers' situation did not improve much since 2002. This would indeed affect the contribution that small-scale farming could have been made in terms of food security, job creation, sustainable livelihoods and income creation for the farmers' household and the whole community. The main changes included tomatoes as an important crop and that markets were accessed more widely.

5.6 Sub-problem two: What assets or support from farmers' associations, DAEA and NGOs that have helped farmers overcome the constraints experienced?

During the group discussions, the participants were asked to identify the institutions and policies which had assisted them in their farming activities. The institutions that the farmers' mentioned included farmers' associations, DAEA and NGOs and were reported on fully in Section 5.4.3. A brief summary is included in this section.

- The participants in block 6 obtained support from a farmers' association called 'Impumelero'. It assisted them with poultry projects and trained them to make traditional mats to be able to generate income. This farmers' association also trained the farmers in terms of sewing and cookery which could also be used to generate income.
- The participants in block 6 also obtained support from 'Tembalethu', another farmers' association, in terms of advice and guidance needed for their farming activities.

- The farmers in block 12 obtained support from 'Vuka Ibambe' which was a farmers' association and which supported them generally in their farming (support not specified).

These farmers' associations apparently were formed around projects, but participants did not know specific details.

- Further support that the farmers in block 6 reported receiving came from DAEA, which provided extension services. The DAEA also supported the farmers by building fences for chicken projects. In addition the DAEA supported the same farmers with chickens and feeding equipment. Furthermore the DAEA generally supported the farmers with water from the scheme to irrigate their plots.
- The farmers in block 12 obtained support from the local municipality which provided fencing for the gardens.
- 'Pannar Seed' company supported the farmers in block 6 and 15 by delivering seed to them in bulk.
- Agrochemistry company also supported the farmers in block 15 at the farmers' day at the agriculture office (support not specified).
- LIMA and FSG which are both NGOs had supported the farmers in block 15 with developing constitutions for their farmers' association.

5.7 Summary of sub-problem two

Sub-problem two showed that there were some institutions, which supported small-scale farmers on the Mooi River irrigation scheme. These included farmers' associations, DAEA, and NGOs. The support that the farmers obtained was helpful because each one

was important to their farming activities and the farmers needed them. However, subsequent improvements in crop production did not seem very great.

5.8 Sub-problem three: To determine what is needed by local farmers' associations in order to improve farming outputs

Sub-problem three set out to show what is needed by farmer associations in order for their farming outputs to improve. The farmers took the following actions:

- Obtaining funding to buy fencing material, a tractor and seeds;
- Obtaining leadership training to be able to manage farming activities and projects
- Using farmer associations' constitution properly to be organized and guided by its guidelines to improve their functioning.
- Obtaining a tractor for hire with the DAEA help
- Finding a place to establish a market to sell their produce
- Re-establishing the management of the pack house as a loading point to market
- Attending local agricultural meetings to know and learn from other farmers and network with them
- Obtaining gates to prevent animals from getting into the irrigated plots
- Applying to the DAEA for more dams, sprinkler systems and water pumps to get more water to irrigate the plots
- Pray and make more dams because of shortage of water
- Approaching the local municipality for water pumps and fencing
- Following the irrigation schedule more diligently to share the available water more fairly.

5.9 Summary of sub-problem three

It was important for the farmers to make plans of action for themselves as these could contribute to the improvement of their farming outputs and minimize their constraints as they understood their problems better than outsiders.

Looking at the actions that the farmers planned to take in order to improve their farming activities, it is clear that some of them were just dreams while others were feasible. Actions like obtaining funding, markets, gates for the plots, more dams, sprinkler, water pumps seemed to be dreams for them. Help was expected from outside institutions but without understanding what it would take to make these a reality. Other actions like obtaining leadership training, using farmers' associations' constitutions and attending agricultural meetings seemed to be more likely to occur for the farmers.

5.10 Sub-problem four: To what extent have the recommendations from the 2002 survey been met by 2005 on the Mooi River irrigation scheme.

Sub-problem four sets out to assess if the recommendations made in 2002 by Le Gal (2002) were met by 2005. After the research done in 2002 on the Mooi River irrigation scheme, the following recommendations were made (as discussed in section 5.4.5):

- Implementation of a health policy by the government to secure farmers' health;
- Development of cash crops;
- Introducing land tenure policy to improve farmers' land size;
- Greater involvement of block committees in water management;
- Water to be paid, for to help manage the irrigation scheme;
- Establishment of a local micro-credit system;
- Establishment of collective organisation of input supply and marketing;
- Improvement of technical assistance especially from the DAEA;
- Implementation of an efficient information system;
- Enhanced relationship between public bodies (DAEA, health department etc) communities and farmers' committees;

The recommendation of health policy had not been met in 2005 as the labour force continued to decrease. In addition the number of household's members had decreased, possibly through higher mortality rates. This means that the health policy suggestions

were not adopted in 2005 as people's health was still poor with only mobile clinics available.

The development of cash crops was recommended in order to encourage young people to become involved in farming, because, in 2002 it was found that young people were not interested in agricultural activities and farmers were mostly older people. This was noticed by looking at the age of people who were involved in farming. This recommendation was not met in 2005 because there were few other cash crops grown by the farmers except tomatoes. Garlic and chillies were grown by fewer farmers.

The recommendation regarding land tenure policy was not met in 2005 because participants reported that there was only a slight decrease in number of plots owned since 2002.

In 2002, there was also a recommendation of greater involvement of block committees and also the water to be paid for in order to help manage the irrigation system. It was reported that in 2002 there was a poor coordination of water management because of lack of maintenance, conflicts between upstream and downstream blocks as well as water shortages and wastage. This recommendation was not met in 2005 as poor coordination and management of the scheme still prevailed and the canal was not maintained. In fact, from the researcher's observation, there were plastic bags and rubbish in the canal which stopped the water from flowing. The conflict between the irrigators was still persisting in 2005 as some farmers did not follow their schedules for irrigation. In addition, the blocks which were closer to the dams and river got water while the farmers which were downstream from the dams and original river water source still did not.

In order to minimize the problem of lack of cash among the farmers which resulted in difficulties in accessing inputs, the establishment of micro-credit system was suggested. This recommendation had not been met by 2005 as there was no micro-credit system for farming established on the Mooi River irrigation scheme.

Collective organisation of input supply and marketing in 2005 was apparently only through Pannar Seed that delivered seeds in bulk. As for organisation for collective marketing, little changed as the farmers did not establish markets to sell their produce and there was little evidence of coordination towards getting produce to distant markets.

It was recommended in 2002 that there should be improvement of technical assistance especially from DAEA in order to improve knowledge and information of the farmers. The implementation of an efficient information system had also been recommended. These were not met by 2005 because there was little technical assistance and still large gaps in agricultural knowledge reported. In 2005 the farmers did not know that there were regular agricultural meetings at Tugela Ferry and they missed the meetings. This was important as the farmers met and presented their problems to the DAEA and other institutions like agrochemical companies. During the 2005 research, the farmers planned to attend agricultural meetings in the future and decided to strengthen their committees in order to know what was happening around them in relation to farming.

From the 2002 survey, it was recommended to enhance relationships between public bodies, communities and farmers' committees. Only the relationship between the DAEA with the farmers worked to some extent, but this relationship was not strong because the farmers were complaining about the delay and provision of the services by the DAEA. "They (DAEA) no longer visit the lands to give advice." In addition, it was noticed that there were few other public bodies to partner with the farmers in the area at the time of the study. Only the municipality was mentioned in relation to fencing.

5.11. Summary of sub-problem four

It was found that most of the recommendations made in 2002 had not been met. Such as: the implementation of health policy; the development of more cash crops; a new land tenure policy; the greater involvement of block committees; charging for water; the implementation of a local micro-credit system (and farmers still faced the challenge of lack of funding with no credit facilities in the area); and improvement of farmers' knowledge and information.

Nothing has been done on the Mooi River irrigation scheme since 2002 in terms of the above-mentioned recommendations. The only small improvement was the greater diversity of crops planted (especially in Block 6), but this cannot be ascribed to any one specific cause.

Farmers were all insistant that farming had definitely deteriorated since 2002 in respect of crop productivity, farming income and amount of livestock.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to investigate the changes in farming and farmers' associations in supporting small-scale farmers on the Mooi River irrigation scheme at Muden between 2002 and 2005. The study also investigated the activities of farmers' associations, NGOs and DAEA in support of small-scale farmers and the activities that could be provided to help small-scale farmers overcome their constraints, during the period mentioned.

These changes were explored through the investigation of four sub-problems. Sub-problem one was to determine the changes reported by small-scale farmers and farmers' associations since 2002 regarding their farming production and marketing. Sub-problem two was to determine reported support from farmers' associations, DAEA and NGOs that have helped to overcome constraints experienced. Sub-problem three was to determine what was needed by local farmers' associations in order to improve farming outputs. Sub-problem four was to determine whether the recommendations which resulted from the 2002 survey regarding health policy, land tenure policy, cash crops, involvement of block committees, payment for water, micro-credit system, collective organisation of input supply and marketing, improvement of technical assistance, efficient information system, relationship between public bodies, communities and farmers' committees were met by the year 2005.

The study was conducted on a sample of farmers in same irrigation blocks (6, 12 and 15) which were randomly selected from 15 blocks of the Mooi River irrigation scheme in 2002. To contact individual farmers, arrangements were made with extension officers to arrange meetings with the farmers from each block selected for this study. Their participation was based on the availability and how ready the farmers were to attend the

discussions. Sampling was convenience based with an estimated 25 percent sample of farmers.

The data collection methods used in this study were household survey and focus group discussion guided by sustainable livelihood analysis.

The study was conducted in participatory manner and some of the Participatory Learning and Action (PLA) techniques were used in order to stimulate the participation and the learning of the farmers through the process of developing plans of action.

Household surveys were used to collect data on demographic detail of the samples. Sustainable livelihood analysis data requirements were used to guide this technique. This encouraged the participants to identify for themselves their assets in terms of the number of people in a household, age, educational level, skills and contribution to the farming activities and off-farm income.

Focus group discussions were used in order to assess farmers' livelihoods and to encourage their growth by identifying farming assets, problems and the relationship between assets and forces influencing them. Farmers identified their assets and institutions which supported them. In addition farmers identified their constraints and developed simple plan of actions in order to improve their farming and marketing.

6.1 Summary of findings

There were some changes in small-scale farming activities on the Mooi River irrigation scheme from 2002 to 2005. On a household level, household size was reduced from 6.8 members to 5.4 members. The fact that the number of household members decreased might affect family labour availability as it is known that for small-scale farmers, family labour is important.

On the Mooi River irrigation scheme young people were not involved in farming activities. The average age of people involved in farming activities reduced from 62 in 2002 to 54 in 2005. This shows that farming activities were still mostly done by older people and this may affect the farming activities as older people, who are not as energetic and less educated than young people, were the ones who did the farming.

Women involved in farming activities were 51% and men were 49 %. This reflects that the farming activities may be less effective if it is done mostly by women because they have other household responsibilities. Small-scale farming activity may improve if men are as involved as women.

Education plays an important role in farming activities. Since 2002, on the Mooi River irrigation scheme, there was no improvement in small-scale farmers' education. In 2002 about 36 percent of the farmers did not have any education while in 2005 about 51 percent of the farmers did not have any education. This shows that the situation of farmers' education became worse in 2005. Lack of education affects farming activities as without it, farmers cannot read information, they cannot follow farming instructions and they cannot learn to use modern technology in order to improve farming activities.

Farmers' skills are very important for farming activities. It was found that there have been changes in terms of skills for small-scale farmers on the Mooi River irrigation scheme. In 2002 only 6.3 percent of the farmers had non-farm skills and this improved in 2005 where 71 percent of the participants had skills. There had been some improvement in farmers' to have skills. Having skills is very important as it can help the farmers be involved in other activities in order to gain additional income to improve their farming activities and meet households' needs.

The findings of this study showed that in terms of involvement in farming by family members, the involvement in farming has increased in 2005. The results showed that in 2002 about 16 percent of households had at least one member fully involved in farming and this improved in 2005 where 50 percent of the households had a member fully

involved in farming. In addition, in 2002 about 14.5 percent of the household had people who were partly involved in farming and in 2005 about 27 percent were partly involved in farming. This shows that the family members were more involved in farming in 2005.

Concerning the changes in off-farm activities, there were no changes since 2002 to 2005 as the percentage of the households with no off-farm worker remained at 53 percent.

The study showed that there was little change in types of crops grown in 2002 and in 2005. The crops grown were maize, beans, garlic, potatoes, onions, green maize and chillies. But there was change in the cash crops grown. In 2002 the farmers sold more garlic. This declined in 2005 where many farmers did not sell garlic. Instead in 2005, 9.6 percent of the farmers sold chillies as a cash crop. However there were many more farmers selling tomatoes in 2005 than in 2002.

There was a change in selling potatoes as in 2005 slightly more farmers sold potatoes (69%) than in 2002 (60 %). More farmers sold onions in 2002 than in 2005. More farmers also sold maize in 2005 than in 2002. This does reflect some adaptation of crops supplied to current market needs.

The farmer's markets in 2002 were local people, hawkers, Indian traders and local supermarkets. In 2005 the farmers were no longer selling their produce to the supermarkets but using Greytown, Pietermaritzburg and Durban outlets.

There was a change in obtaining equipment for the farmers as in 2005 the farmers acquired more manual equipment than in 2002. These included hoes, pangas, spades, garden forks, sickles, watering cans, bush knives and sprayers. Though the farmers acquired more equipment by 2005 than in 2002, there were no changes in acquiring larger modern technology such as tractors, trucks and water pumps as these were still lacking in 2005 as in 2002.

This study showed that the farmers experienced changes in their livestock. The changes were caused by the drought that killed their animals. The livestock that the participants had were cattle, goats, chickens and donkeys.

The participants had many constraints that affected them in their farming activities. These were thunder and lightning linked to lack of insurance in the case of loss of their produce and drought and frost that damaged their crops. The farmers also lacked fencing for their plots and as a result, the goats got into their fields and destroyed their crops. There was also the problem of a shortage of water and these affected farmers as they could not do anything without water to irrigate their plots. They also lacked capital for their farming inputs and equipment.

Small-scale farmers obtained support from the farmers' associations, NGOs and the DAEA in the area of Muden. A number of farmers' associations were mentioned that helped farmers with poultry projects, skills training, advice and guidance. Another support that the farmers obtained was from the DAEA which assisted the farmers with "scarce" extension services, training, chicken projects and providing water for irrigation but inadequately. The local municipality had assisted them with fencing. Commercial companies were helpful with bulk delivery of seeds and information. There were also NGOs (LIMA and FSG) that assisted the farmers with the farmers association constitutions.

In this study, the participants drew up plans of action of what needed to be done in order to improve their farming activities. For the farmers, funding was needed in order to buy fencing material, tractors and seeds. Suggested funding sources were through a borrowing strategy where cash would be borrowed into phases and then paid back slowly after selling their produce. Source of funding was not identified.

The farmers also planned to obtain leadership training in order to manage their farming activities and the projects. In addition, the farmers planned to use the farmers associations' constitutions and not ignore them. The participants also planned to obtain a

tractor because there were very few tractors (total number not known) available for hire and many farmers missed the right time for planting. They planned to hire it out in order to get money to pay the driver (but no comment was made about payment for fuel and maintenance).

The farmers planned to find a place where they could establish a market to sell their produce. Asking their extension officers to go to the DAEA to find them a place where they could sell their produce would do this. In addition, information was going to be obtained by attending local agricultural meetings in order to know what was happening with other farmers, to learn to network as well as to be known by the institutions. The farmers decided to re-establish management of the pack house as a loading point for fresh produce to markets.

The farmers decided to obtain fencing and gates, which they could open and close in order to prevent the animals from getting into their plots. Some sources of funding were suggested.

The participants planned to get water, which could be achieved by getting more dams, obtaining sprinklers and water pumps to bring up more water from the river. This was going to be achieved by taking a strategy of paying for the cost when the necessary items had arrived. The farmers also decided to pray and build more small dams. They also decided to ask the DAEA for water pump to fill their existing dams as four of them were always dry. In addition the participants planned to approach the municipality to ask for water pump and fencing. They furthermore planned to follow the irrigation schedule so that they would share the water fairly.

6.2 Conclusions

Looking at sub-problem one, there were changes reported by small-scale farmers and farmers associations on the Mooi River irrigation scheme since 2002. These were in relation to their farming production and marketing: farmers experienced positive changes

in their farming activities which were: selling more tomatoes, potatoes and maize, having more equipment in 2005 and using a few more dispersed markets. There were also negative changes in their farming since 2002: slight decrease in number of plots owned, decrease in garlic cash crop, decreases in local formal markets and in livestock numbers. There were also no changes in off-farm activities and acquisition of modern equipment.

Concerning sub-problem two regarding reported support in terms of Farmers' associations, DAEA and NGOs have attempted to help to overcome the constraints experienced. The farmers on the Mooi River irrigation scheme obtained support from specifically focused Farmers' Associations. The farmers also obtained support from DAEA (although they complained that it was too little) and the local municipality. In addition the farmers had obtained support from NGOs. Commercial companies, such as the Pannar Seed and an Agrochemistry Company had also helped them.

Sub-problem three related to what was needed by farmers associations in order to improve farming outputs. The farmers needed funding, leadership training and to use farmers' association constitutions properly. The farmers also needed to obtain a tractor, an appropriate market for their produce and attend agricultural local meetings. The farmers also needed to obtain gates, more dams, sprinkler systems and water pumps.

Sub-problem four related to whether the recommendations made in 2002 were met by 2005 in terms of: implementation of a health policy, development of cash crops, introducing a better land tenure policy, greater involvement of block management committees, payment for water to help manage the irrigation scheme, establishment of micro-credit system, establishment of collective organization for input supply and marketing, improvement of technical assistance especially from the DAEA, implementation of an efficient information system, enhancement of a relationship between public bodies, communities and farmers' committees. None of these recommendations had been met by 2005.

6.3 Recommendations to improve farming

After looking at the conclusions of this study and realizing that there were no major improvements which took place in small-scale farming on the Mooi River irrigation scheme between 2002 and 2005. The following recommendations are made.

6.3.1. Encouraging the younger generation to be involved in agriculture

As it was observed in this study, young people were not involved in farming. Small-scale farming cannot progress if young people are not involved in farming. This is because young people are more energetic and educated than older people. Young people's energy is needed for farming activities which demand strength and energy.

Not only the energy of young people that is needed for farming but also their knowledge. With education farmers can be able to interpret the agricultural information, use agricultural instructions properly, use modern agricultural technology and link with agricultural institutions.

In this regard, young people need to be motivated to be involved in farming activities using their skills and knowledge. These could be achieved by making small-scale farming attractive to young people by providing the agricultural facilities such as tractors, fertilisers, appropriate credit, irrigation facilities and improved markets.

6.3.2 Education and training for small-scale farmers

As was shown in this study, education was lacking among small-scale farmers as the level of illiteracy was high in the study area. It is recommended that adult Basic Education and Training to be introduced so that small-scale farmers who are unable to read and write learn at least the basic of reading and writing in their own language.

It is recommended that more schools to be introduced on the Mooi River irrigation scheme and they should not be so far from children' homes. In addition there is a need to introduce tertiary agricultural training near the Mooi River irrigation scheme and also education curriculum be related to better farming production so that people will be given agricultural skills and be able to use improved farming techniques. This will also help farmers to generate more income to be used in their farming activities. As was mentioned earlier in this study, small-scale farming once supported, can make a great impact in the community and in the society. It is in promoting education and training for small-scale farmers that may contribute to the improvement of small-scale farming.

6.3.3 Creating local jobs for farmers with skills

As it was mentioned in this study the number of farmers with non-farming skills had improved in 2005 compared to 2002; however, it is important for the farmers with skills to be able to generate some off-farm income using their skills by creating jobs for themselves. Farmers on the Mooi River irrigation scheme had skills of farming, driving, baking, sewing, craft, and building, painting and mechanical skills. With these skills, the farmers could have more job opportunities and this can help the households earn more income which can be used to improve their farming activities. Different projects can be created and the government many need to intervene and encourage farmers to use their skills through projects to generate income.

6.3.4 Market opportunities

Having accessible markets is also among the issues which can improve small-scale farming in Mooi River irrigation scheme. When the farmers have access to markets, their farming can be expanded and grow. Farmers on the Mooi River irrigation scheme need a market where they can sell their produce. In this study the farmers mentioned that they sold their produce in Greytown, Pietermaritzburg and Durban but on an individual basis. It is recommended that the DAEA make arrangements so that the farmers can sell their produce more reliably to other provinces beside KwaZulu-Natal province.

In this regard, it is recommended that the farmers have a pack house where they can store their produce correctly before taking them to the market. A viability study for the positioning and necessity of a pack house would need to be conducted. It is also recommended that the farmers be given market information by the DAEA so that they can choose the most profitable markets for their produce. They can also match their price with the outside producers and help determine their prices confidently through bargaining.

In order for the market to be successful, there is a need for infrastructure like good roads and transportation facilities (trucks). In this regard, it is recommended that the roads in Mooi River irrigation scheme be repaired so that the buyers, the researchers, development practitioners, NGOs and other people who want to meet with the farmers can do so easily. In addition, the farmers need transport in order to transport their produce to the pack house and markets.

6.3.5 Promoting credit facilities

It was noted that there were still no credit facilities for small-scale farmers on Mooi River irrigation scheme. As a result, the farmers were not able to have capital to use in their farming. It is then recommended that credit institutions be introduced in the area so that small-scale farmers would be able to get credit. In addition, the interest rates need to be appropriate so that the farmers can be able to afford credit.

The farmers need also to organize themselves and form a way of promoting farmers' credit such as "stokvels", which are common in many South African rural areas; and community banking. They can also organize themselves into lending cooperatives. These can help the farmers have money to use for their farming activities.

6.3.6 Promoting farming technology for small-scale farmers

It was noted that the small-scale farmer participants did not have modern farming technologies like tractors, trucks and motorized water pumps. It is recommended that

tractors be available from DAEA for hire to the farmers in order to make their work easier and faster. In order for the farmers to take care of the tractor, the government or local large commercial farmers can charge for its use and its maintenance. It is also recommended that motorized water pumps be introduced by DAEA on the Mooi River irrigation scheme so that the farmers can get enough water to irrigate their plots. There is a need for management and leadership to be able to control the use of these technologies.

This will be very helpful to the farmers who face a big challenge of lacking water that makes their plots and crops dry, resulting in poor yields.

6.4 Recommendations for improvement of the study

Concerning sampling, simple random sampling could have been used from the list of all the farmers from each block (block 6, 12 and 15) in order to give a chance to each farmer to participate in the study. Convenience sampling which was the one used in this study motivated only those who wanted to volunteer to participate and not every farmer did volunteer to participate. This means that the sample may not be representative of all the farmers.

In order to get more insight into farming activities a transect walk as a participatory tool could have been used. This would have helped the researcher to visit some farms and provide more detail and in-depth answers.

In this study, it may have been better to conduct the study with the farmers without the presence of extension officers as the farmers were not free to express themselves. This was seen especially when the farmers were asked about the involvement of DAEA in their farming. However their presence was valuable in explaining to the farmers about access procedures for funding, meetings, projects and other issues in response to the plans of action.

The researcher could also have conducted semi-structured interviews with the extension officers in order to give their own view regarding the farming that they supervised. In

addition, the researcher could have interviewed the institutions mentioned by the farmers which are farmers associations, NGOs and DAEA, commercial companies in order to gain more insight into their activities on the Mooi River irrigation scheme.

Concerning the plans of action, the farmers were supposed to note for themselves the actions that they could take and write the strategies they could take. However, many of these were simplistic and needed to be the subject of further workshops and Farmers' Days.

Concerning sustainable livelihood analysis, the farmers could have completed the sustainable livelihood analysis record which would clarify strategies for the researcher and the participants to learn about their livelihoods, but writing was very difficult given the level of literacy present.

6.5 Implications for further research

The implication for further research could be the evaluation of the effectiveness of the extension services given to small-scale farmers on the Mooi River irrigation scheme. From this, the weaknesses and strengths of extension services to the small-scale farmers could be identified and improvement be applied.

It is important to evaluate whether access to credit by small-scale farmers in the study area is feasible, would contribute to the improvement of farming outputs and minimize the constraints of lacking tractors, fencing, irrigation facilities and seeds. In addition, it could be useful for future study to investigate the impact of farmers' cooperatives on the development of small-scale farmers on the Mooi River irrigation scheme.

As it was noticed that water availability was a big challenge for small-scale farmers on the Mooi River irrigation scheme, the investigation of the impact of better water management on the farming activities is needed because when water is used by different farmers, it can be wasted or used selfishly by some blocks while others are left dry.

Another interesting area of study could be the evaluation of whether partnerships between small-scale farmers and commercial farmers (immediately outside the scheme) could bring positive changes for the development of small-scale farmers on the Mooi River irrigation scheme. In addition it is important for future research to assess the links between commercial farming and small-scale farming to identify how small-scale farmers could be encouraged to become more commercial.

This study was conducted with farmers in the same area of Mooi River irrigation scheme. There were few major differences in the farming activities of the three blocks in this study. For the future study, different groups of farmers of varying success levels should be compared and then evaluated in order to compare different interactions in their farming, variations in constraints and the contribution to their success.

Investigations of institutions mentioned earlier in this study, which are involved with small-scale farmers on the Mooi River irrigation scheme should be conducted for the future study in order to know exactly what they do and to assess their actual involvement with small-scale farmers on the Mooi River irrigation scheme.

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Appendix A: Household survey



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University of KwaZulu-Natal Research Survey

Introduction

Thank you for participating in this survey. You are kindly requested to answer the following questions. Participation is voluntarily and you are free to withdraw from the discussion. The information you provide will be valuable and they will be used for the purpose of this study only and they will be confidential. Your name will not be mentioned in this study. Please can you assist us to answer the following questions as fully and truthfully as you can?

Thank you for your help.

Appendix B: Sustainable Livelihood Analysis and Focus Group Discussion

Community.....
survey:.....

Block:.....

Date of

Number of farmers in attendance.....

2.1 Plot inventory

Number of plots	Gender	Rental	Ownership

Average number of plots per farmer.....

2.2 List of crops that are grown now in descending order

Crops in descending order of value	Why	Total income from farming for last season

2.3 New Farm owned equipment since 2002

Type	What is it used for	State	Mode of acquisition	The change since 2002-2003

Tractor,
Bakkie,
Sprayer,
Hand hoe,
Other

Operating
Damaged
Used
New

Gift
Cash
Loan
Heritage
Borrowed

2.5 Crop changes since 2002

Types	Quantity harvested	Quantity sold	Price per unit	Buyer (Where who)	Total price

INSTITUTIONS AND POLICIES

2.6 What are the institutions that exist in your area over last 2 years?

Institutions	What potential policy are there	Who has been helped	Who has been constrained	How

DAEA and other government departments
 FSG and other NGOs
 FA and other internal cooperatives or groups
 Financial services and other banking groups

Appendix C: Photos of research area



A plot of land for small-scale farming on the Mooi River Irrigation scheme



A farmer spraying to protect her crops on Mooi River irrigation scheme



Meeting with the farmers on the Mooi River irrigation scheme



Irrigation system on the Mooi River irrigation scheme