INDIGENOUS KNOWLEDGE SYSTEMS IN FOOD GATHERING AND PRODUCTION IN SELECTED RURAL COMMUNITIES IN SEKHUKHUNE DISTRICT OF THE LIMPOPO PROVINCE

BY

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DISSERTATION

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ABSTRACT

Recognition of the indigenous knowledge systems of the people is the necessary first step towards strengthening the people and the agricultural extension, which is designed to develop the local people. The study was designed to examine the current indigenous food systems in the field of food gathering and production of selected rural communities and prioritise them. Women especially those in rural areas have extensive agricultural indigenous knowledge. However, women are at a crossroad, because resource poor rural farmers do not know whether to continue with indigenous food gathering and production, or to adopt modern technology, which they cannot afford.

Indigenous ways of food gathering and crop production are not well documented and transferred to young people. The inability to document and adapt the indigenous knowledge system to the modern farming situation in South Africa has contributed to food insecurity in rural areas and in Sekhukhune district in particular. Among rural women, the potential of indigenous food gathering and production knowledge exists, but it is not fully exploited and exchanged among local farmers and the current extension system. Indigenous knowledge in food gathering and production has been lost, and there is thus a need to re-orient and renew indigenous food gathering and production knowledge and combine this knowledge with modern farming systems through the agricultural extension system.

Data were collected from 42 extension workers and 355 farmers. Gathering indigenous wild fruits and vegetables ensures household food security and sustainable livelihoods. The whole process is age and gender specific where women aged forty years and above have more knowledge than men. When the responses of the farmers in relation to indigenous knowledge were compared to that of the extension workers, the farmers had more knowledge of the indigenous fruits and vegetables than the extension workers. The implication of this to the current extension programme is for the extension workers to sit back and begin to learn from the farmers thus incorporating the indigenous knowledge of the farmers into the main stream extension.

Agricultural research and extension programmes must integrate food considerations of the communities served to ensure that technologies developed and projects designed respond to the needs of the community. The role of indigenous technologies and knowledge systems i.e. relating to indigenous crops, wild sources of food, bee keeping and fisheries must be promoted. Aspects of post-harvest handling, especially for resource-poor households, must also be incorporated. Indigenous cooperatives such as “letšema” should be brought into the main stream of extension to save time and to increase productivity in terms of labour output.

One of the millennium goals is to decrease poverty by 2015. Governments are looking for sustainable ways of decreasing poverty. One of the strategies could be the promotion of indigenous crops and to encourage communities to resort to these crops. Their advantages are that they resist drought while the current communities indicated that they do consume them. Therefore, if indigenous crops and vegetables are promoted within the rural sector, poverty could be eliminated while the surplus received will be sold locally and can also be exported to neighbouring countries.

DECLARATION

I declare that the dissertation hereby submitted to the University of Limpopo for the degree of Master in Agricultural Extension has not previously been submitted by me for a degree at any other University; that it is my own work in design and in execution, and that all materials contained therein has been duly acknowledged.

Signed …….

Mosima Masekoameng

Date……..

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TO

MOSHOTLI, RENEILWE, LEGODI, CATE AND SEKINA

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CHAPTER 1

1. INTRODUCTION

1.1 Background

Anthropologists and sociologists have been studying indigenous knowledge systems for more than a century, and within the last twenty-five years many detailed publications in the field of ethno-science have appeared. They also studied the relationship between indigenous knowledge systems and development (Brokensha, Warren & Werner, 1980:1). According to Mammo (1999) indigenous knowledge, traditional practices and local institutions play a major role in the eradication of poverty in Africa. Extension programs and development projects cannot offer sustainable solutions to local problems without using local knowledge. To ignore people`s knowledge is almost to ensure failure in development (Brokensha, Warren & Werner, 1980:7).

Indigenous knowledge (IK) has been defined in different ways but all mean the same thing (Ajibade, 2003). It can be defined as institutionalised local knowledge that has been built upon and passed on orally from one generation to the other (Warren, 1992). According to Pawluk and Sandor (1992) indigenous knowledge is developed within a certain culture or ethnic group and strives to meet subsistence goals in a particular ecological setting. In practical terms, indigenous knowledge is considered as the indigenous technologies developed by local communities to solve a particular problem, taking cognisance of all the local relevant factors. The term indigenous knowledge is best used to distinguish between knowledge systems developed by a community and scientific knowledge system, which are referred to as “western” or “modern” knowledge (Ajibade, 2003).

Indigenous knowledge systems (IKS) are traditional norms and values, which define the identity of a society through their food, nutrition, technological tools, which are used in food production or gathering, processing, preservation, storage, utilization,

preparation methods and food sharing. In the case of agriculture, solutions to farmer's problems are developed by farmers themselves, and their technological knowledge is specific to the farm's environmental conditions and indeed the farmers` needs (Ajibade, 2003). IKS refer to the unique traditional, local knowledge of a particular geographic area. IKS are a matter of survival to the people who generated them. Such knowledge is cumulative, representing generations of experience, careful observations, trial - and error experiments. When a knowledgeable old person dies, a whole library disappears (Grenier, 1998:1). To avoid that, IKS should be well documented and preserved as a heritage for future generations.

1.1.1 A need for an alternative collection of wisdom

Indigenous knowledge systems (IKS) has been lauded as an alternative collective wisdom relevant to a variety of matters at a time when existing norms, values and laws are increasingly called into question. Green revolution has failed in most Third world countries (where farmers had differing needs, values, and constraints to those where the technology had been developed). In Africa, in particular, in times of stress (like droughts or government economic turmoil) the new varieties introduced in an effort to increase yields and boosts export came with new pests, decline in soil fertility and various problems unknown to the rural communities (Semali & Kincheloe, 1999:245). These lead to a need for an alternative approach to food production.

The need for some alternative wisdom in development and extension initiatives is supported by the following observations: "… green revolution technology is associated with ecological deterioration, economic decline at local level, poor diets, and nutritional losses resulting from the eradication of traditional foods or from their substitution by non traditional foods" (Grenier, 1998:6). It is in this context that this research was conducted in Sekhukhune district with the aim of incorporating the indigenous food gathering and production activities of the rural communities into development programs for the eradication of poverty and to ensure both household food security and sustainable livelihoods.

1.2 The need for documentation and the promotion of Indigenous Knowledge Systems (IKS)

Experience has shown that, lack of documentation and the promotion of IKS in food gathering and production has resulted in a major shift from traditional food systems, which were more sustainable, to modern food systems that have exposed local societies to food insecurity. According to Semali & Kincheloe (1999:245) the indigenous food processing methods and indigenous foods are proving more relevant in the alleviation of hunger in most African countries. Indigenous knowledge systems in the field of food gathering and production (agriculture) can decrease household food insecurity.

A research conducted by Kibuka- Sebitosi (2006: 117) indicated that the use of gathered foods such as Amaranthus spinosis, Amaranthus lividus and Amaranthus dubious provide household nutrition security. Kibuka- Sebitosi (2006) further argued that these gathered plant leaves are rich in Vitamin A and C, iron, minerals and fibre. Some communities in Uganda gather indigenous foods and sell them thus eradicating household food insecurity. Household food insecurity is the inability of the household to procure a stable and sustainable basket of adequate food. A food basket implies enough food that is accessible, nutritious and culturally acceptable. As Semali & Kincheloe (1999:245) observed "… we have also increasingly found that when domesticated cultivars have failed because of drought, many edible, indigenous, non-domesticated species have survived and provided alternative food sources".

Of the indigenous knowledge systems, food systems are the core to the survival of society and yet that knowledge has been allowed to vanish with time. Food systems are a collection of all biophysical, economical, technological and socio-political factors that contribute towards the gathering/ acquisition, production, distribution, storage, preparation, utilization and consumption of food for the health and the community's well-being. Indigenous food system is the traditional way of acquiring, producing, distributing, storing, utilizing and consuming of local food that is age old, time tested and accepted by the society as their way of survival (Grenier, 1998:15).

Early studies on dietary intake reported the use of a wide variety of indigenous foods and procurement methods among the rural populations in South Africa, thus ensuring adequate diets and reducing food insecurity (Quin, 1959; MacIntyre, 1998). As was pointed out by Grivetti (1978), dietary diversification was a successful coping mechanism against the effects of food shortages brought by draught and other natural disasters and essential for nutritional wellbeing thus reducing food insecurity. On the other hand, Vorster, Menssink, Staden, Labadarious, Strydom, Silvis, Gericke and Walker (1994) could show in their study among the adult rural Venda population that even with a limited dietary diversity a reasonably adequate nutritional status could be achieved if a staple food such as maize was supplemented with indigenous foods such as legumes, gathered vegetables and nuts.

There is a wide variety of indigenous species that grow naturally and can withstand adverse conditions such as drought. Some of these species are edible and can be gathered and used as food. In order to be able to use the species as food, indigenous knowledge in terms of identification and gathering is essential. Thus, it is important to know which species are edible and which ones are not edible such as mushrooms and vegetables. Indigenous knowledge entails the kind of foods to be gathered, the methods used to gather them, processing, preservation, preparation and serving methods (Quin, 1959). By having this knowledge and using it, food insecurity can be reduced because of the utilization patterns which emanate from having such knowledge.

1.3 The importance of indigenous foods to the rural communities and households.

There is evidence to show that traditional African societies and communities were food self-sufficient and generous, to the extent that no member of the society was exposed to malnutrition and hunger, contrary to what is happening today, where some members of the society are exposed to hunger and malnutrition. The society ensured that food production was done communally so that every household had food throughout the year (Quin, 1959).

Tieku and Mollel (2000: 210-222) indicated that if sorghum production was high, the households store it in the *sešego.* The *sešego* could store sorghum for over 10 years and still maintains its quality in terms of seed availability and even improved its taste. The efficiency of the *sešego* is due to its ability to maintain low temperatures in the stored material while the material used in the weaving absorbs any possible sweating that might exist due to embryonic breathing of the sorghum grains. Such indigenous knowledge base need to be investigated through participatory extension methods so that data collected at grass roots level could be used as a feedback to the extension programs for the benefit of the rural communities.

When societies abandoned traditional food gathering, production, storage, processing and utilization methods, households were exposed to food insecurity. There is also overwhelming evidence in the literature reviewed, which shows that indigenous foods were more nutritious and safer than modern foods to which African societies are now exposed (Quin, 1959; Quin, 1964, Walker, 1992). "In one part of Taita in Kenya, over 80% of the households used one or another indigenous species for different purposes ranging from vegetables (amaranthus), fruits (e.g. Tasmania tree or *Tamarindus indica*), nuts/seeds (*Cenchrus biflorus*), roots/tuber (e.g. maginga or *Boraossus aethiopum*), spices (e.g. morawa or *Parhia biglobosa*) or sauce thickeners (leaves of baobab tree or *Adansonia digitata*) (Semali & Kincheloe, 1999:261). Literature reviewed shows that, modern diseases such as hypertension, obesity, diabetes and heart diseases were unknown among African societies, when African societies consumed indigenous foods.

The prevalence of modern diseases among African societies today is blamed on colonialism, acculturation, migrant labour system, apartheid, rapid urbanization and disposition of land for food production. The emphasis put on refined foods through marketing channels and local education curriculum is partly responsible for the rapid change in food habits. The current consumption of refined food is associated with modernity or sophistication, while indigenous foods produced and processed using indigenous methods are associated with backwardness. On the other hand, it is abundantly clear that the degree of food insecurity is partly due to lower levels of

both food gathering and food production, and insufficient real incomes to purchase enough food to satisfy household food requirements.

This situation should not be allowed to continue any longer, because African societies are becoming poorer and more desperate for more sustainable solutions to enable each household to feed themselves. It is within this context that food insecure rural households should be encouraged to utilize indigenous African food crops that they can produce and those that are found in their environment such as wild vegetables and fruits. Therefore, this research was conducted with the realization that food gathering and production of indigenous crops, fruits and vegetables, should come with the realization that without proper research in this field, extension efforts will fail to promote them.

The information available from the literature reviewed has shown a common weakness in identifying and solving community problems. Most research done documented what they thought were the source of hunger and malnutrition among the rural communities, but fell short of pinpointing more realistic and sustainable solutions to enable households to feed themselves. Sustainable or long term solutions have to begin with community sensitisation, education, extension and encouragement to the rural communities to fall back to their indigenous food systems, which are more compatible with the ecology of the area.

1.4 The problem statement

The Agricultural Policy in South Africa (1998:7) highlights the serious short and long-term challenges facing South Africa. The experience of most South African households is one of outright poverty or of continuing vulnerability to being poor. According to the Agricultural Policy (1998:7) an estimated 16 million South Africans are living in poverty, with the highest incidence of 70% of the total population living in rural areas. To understand ways and means of decreasing poverty to ensure household food security research need to be conducted focusing on the rural community's indigenous knowledge systems of food production/ gathering, processing, preservation and utilization. Such a wider understanding of indigenous

knowledge systems within the field of food gathering and production of the target communities is essential in addressing household food and nutrition security. With this conceptualisation in mind, the question that will be addressed in this research is:

What are the indigenous knowledge systems in food gathering and production in selected rural communities in Sekhukhune district of Limpopo province in South Africa?

Such a perspective acknowledge the role that indigenous knowledge is playing in agricultural extension, home economics, food and nutrition, human and animal health, the use of management on natural resources, education, rural development, poverty alleviation and sustainable livelihood. It is against this background that the indigenous food systems of the rural communities in Sekhukhune district of Limpopo province were studied so that data collected, interpreted and analysed will contribute to food and nutrition security, and above all to the livelihood of these communities. Indigenous knowledge systems of the communities are viewed in the context of food gathering, production, processing, storage and utilization.

1.5 Objectives of the study

The purpose of the study was to examine the current indigenous food systems in the field of food gathering and production of selected rural communities in Sekhukhune district of Limpopo Province.

The specific objectives of the study were:

1.5.1 To identify the indigenous food gathering and food production systems in Sekhukhune district and prioritise them.

1.5.2 To compare the indigenous food systems of the target communities as recorded in the literature and their current food systems with specific reference to their food gathering, production, processing, storage and utilization.

1.5.3 To find out the contribution(s) of indigenous food systems to household food security and the livelihood of the rural communities.

1.6 The research questions

The research questions for the study were as follows:

1.6.1 Which indigenous food systems are found in selected rural communities of Sekhukhune district in terms their current priorities?

1.6.2 Which indigenous food systems can be identified through the comparative study of literature review and research with reference to food gathering/collection, production, processing, storage and utilization in selected rural communities in Sekhukhune district of Limpopo province?

1.6.3 What is the contribution of indigenous food systems to the current household food security of selected rural communities in Sekhukhune district?

1.7 Significance of the study

South Africa with its new democracy and the challenges posed by high poverty levels needs more community-based solutions towards the alleviation of poverty. It is within this context that research in indigenous knowledge systems in the field of food gathering, production, processing, storing and utilization of the rural communities was conducted so that the findings could contribute to extension and food security programs of the rural communities in Sekhukhune district of Limpopo province. Such a vision is prompted by the assumption that the current extension programs put more emphasis on globalisation, advanced technology and modernity overlooking the indigenous knowledge system, which forms part of the coping strategies of small-holder farmers and mostly the poor who cannot afford modern sophisticated food

systems. A research conducted by the Development Bank of Southern Africa (1998:85) on the trends in field crop production in Sekhukhune district, indicated the increased production of maize and wheat, while indigenous crop such as sorghum production were sad to be declining.

Seeking alternative solutions to poverty alleviation is of outmost importance to the rural communities, the farmers, the non-governmental organizations and the government at all levels. Indigenous food gathering/production, processing, storage and utilization patterns lead to availability of enough foods which has a potential of resisting drought and economical ways of acquiring foods because some of the foods are readily available through nature. Indigenous foods can minimise food insecurity thus ensuring nutrition security especially for the poor households who cannot afford to buy all their foods. A research conducted by Frison, Smith, Johns, Cherfas & Eyzaguirre (2006:167) suggested a multidisciplinary, comparative approach and a holistic food-based approach that combines research to assess and document nutritional and healthful properties of traditional foods as ways to eradicate food insecurity and poverty.

The idea that “modern is superior and /or more effective and efficient” may be proved wrong especially with respect to the indigenous survival strategies of the farmers and rural households in Sekhukhune district (Tieku, 2000:9). This may also reveal some of the indigenous food gathering/production practices of the rural communities and households, which will be taken more seriously by all stakeholders. The revisit of indigenous knowledge systems in the field of food gathering/production, processing, storage and utilization might lead extension workers, farmers, households to value their knowledge and to appreciate it thus boosting their self esteem and above all to recognise it as a science and to start promoting it thus falling back on it. This will in turn, help to guarantee food security and adequate nutrition thus ensuring sustainable livelihoods. Policy –makers and extension managers will be exposed to the hidden novelties of indigenous knowledge systems in the field of food gathering/production and might give them the attention they deserve by incorporating them into the current policies (Tieku, 2000).

1.8 Limitations of the study

1.8.1 Time constraints as data was collected and analysed within two years while research of this nature would need many years of data collection.

1.8.2 The study was confined to selected rural communities in Sekhukhune district where as indigenous knowledge systems in the field of food gathering and production could be gathered beyond this district.

1.8.3 Lack of resources confined the researcher to specific communities.

1.9 Envisaged output

It was envisaged that at the end of the research, the following outputs would be derived:

1.9.1 A comparative framework on the indigenous food systems of the rural communities and whether indigenous foods contribute to household food security.

1.9.2 Recommendations based on the findings from the research would be made available to households/ farmers, extension agents, government and training institutions.

1.9.3 Recommendations might be used as input into the current extension programs of Sekhukhune region.

1.9.4 The research might contribute to scientific publications

1.10 Definition of operational terms

For the purpose of understanding, the following key terms are defined as they relate to the study. A few other terms are defined to demarcate some differences where possible.

1.10.1 Indigenous food systems

Any food systems produced/ gathered naturally in land or region, native or belonging naturally to a region (Mwanyambo, 1994).

1.10.2 Knowledge

For the purpose of this research knowledge implies a person's range of information gained by experience. Indigenous way of knowing, which helps people to cope with their sociological and agricultural environments, which is passed down from generation to generation (Odora-Hoppers & Makhele-Mahlanga, 1988).

1.10.3 Indigenous knowledge

Knowledge is the awareness or understanding of a particular or theoretical thing or fact. It embraces knowledge of tools and techniques for assessment, acquisition, transformation, and utilization of resources in their locality. Knowledge is indigenous (local, tactic or practical) because it differs from the known forms of "formal knowledge" (scientific, Western, modern, colonial) in the contextual sense (as IK is deeply rooted in its environment, history, and new experiences) and its epistemological nature (in the sense that IK) is holistic (Semali & Kincheloe, 1999:247). IK is the information base for a society, which facilitates communication and decision- making.

1.10.4 A System

A system is a set of elements in active organized interaction, with a boundary such as to achieve a common whole or purpose, which transcends that of the constituents in isolation (Sims, 1981:70). If one of the factors or components of the system is changed, this influences all the other components and completely alters the whole system.

1.10.5 Farming System

Is the arrangement of farming enterprises (the components) that are managed in response to physical, biological, and socio-economic environment and in accordance with the farmer's goals, preferences and resources. It includes the use of the natural resources available to the farm and the allocation of land, labour and money to each enterprise/ household activities (Matata, Anandajayasekaram, Kiriro, Wanderan & Dixon, 1995:15).

1.10.6 Food production

According to FAO (1997: 47) food production comprises such factors as land use and tenure, soil management, crop breeding and selection, crop management and harvesting.

1.10.7 Food distribution

According to FAO (1997: 47) food distribution involves a series of post-harvest activities including the processing, transportation, storage, packaging and marketing of foods as well as activities related to household purchasing power, traditions of food use and food exchanges i.e. battering or giving food as gifts.

1.10.8 Food utilization and consumption

According to FAO (1997: 47) food utilization and consumption include those involved in the preparation, processing and cooking of food for home and community levels, as well as household decision-making regarding food choices.

1.10.9 Household food security

Household food security is the use of food in the household, access to it by various members of the household and the role of gender (Schoppink, 1999). According to the Food Security Working Group (1997: 4) household food security in the South African context is seen to encompass the availability, accessibility and utilization of food by households.

1.10.10 Food security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996:7).

1.10.11 Poverty

Poverty is the state of deprivation where basic human needs can scarcely be met at the minimal level required for survival. Poverty can be defined as the inability to attain a minimal standard of living, measured in terms of basic consumption needs or the income required to satisfy them (May, 1998:1).

1.10.12 Agricultural Extension

According to Swanson (1984: 1) “Agricultural Extension” is a difficult term to define, because it is organized in different ways to accomplish a wide variety of objectives. Maunder (in Swanson, 1984: 1) define extension as “ a service or system which assists farm people, through educational procedures, in improving farming methods

and techniques, increasing production efficiency and income, bettering their levels of living, and lifting the social and educational standards of rural life".

1.11 Summary

This chapter commenced with background information on the importance of indigenous knowledge systems in Agricultural Extension and development. It further emphasized the need for an alternative collection of wisdom and the need for documentation and promotion of indigenous knowledge systems. It then touched on the importance of indigenous foods to the rural communities and households. Other aspects covered in the chapter included the problem statement, objectives of the study, the research questions, significance of the study, the limitations of the study and the envisaged output of the study. Finally, operational terms used in the research were defined for easy of understanding.

In the next chapter, attention will be focussed on the review of literature related to the study. An attempt will be made to give a background to indigenous knowledge systems in food gathering and production and its relationship with household food security and agricultural extension.

CHAPTER 2

2. LITERATURE REVIEW:

BACKGROUND TO INDIGENOUS KNOWLEDGE SYSTEMS IN FOOD GATHERING AND PRODUCTION

2.1 Introduction

This chapter covers indigenous knowledge systems and its relevance to agriculture, extension and development programs of the rural communities. For this purpose anthropological, sociological, indigenous knowledge systems in agriculture and rural development literature were used. The study also reviewed the historical and political developments in South Africa. These included colonialism, pre-colonial agriculture and the apartheid system with reference to forced removals and all its subsequence legislations and policies, which were used to marginalize the South Africans. The review took into cognisance the effect of politics on social change and how the change has affected the indigenous knowledge systems of the South Africans.

Some of the authors who wrote on indigenous knowledge systems called for a critical examination of the effects of apartheid on indigenous theory and practice of agriculture in South Africa. Norman, Snyman & Cohen (1996: 123) concluded their recommendations about the importance of indigenous agricultural knowledge systems of the South Africans by asking critical questions such as: "… did apartheid cause a loss of indigenous knowledge of agriculture in South Africa? If so, is the damage repairable? The forced displacement of indigenous South Africans – mostly from fertile lands- and their restriction to areas with agriculturally unproductive soils, must have led to the loss of indigenous knowledge and skills of traditional agricultural practices". What is of value for the current researchers, extension officers, farmers and development practitioners is not to reinvent the wheel but rather to document

what is left or currently exist in terms of the indigenous knowledge systems of the rural small-scale farmers and households, and to re-evaluate it in the context of the current development needs and goals of extension in South Africa to ensure food security and sustainable livelihoods.

In this context, Seepe (2001: 28) argues that: "… indigenous knowledge systems are about reopening crucial files that were closed in the chaos and violence of colonialism in which the cultural, scientific and economic life of the colonized was subjugated and crushed. It proposes to redress this by retrieving rich human perspectives developed over generations. It is thus linked to Afro centricity- a process of placing the African worldview at the centre of analysis".

2.2 Sources of literature on IKS in the field of food gathering and production

2.2.1 Food gathering

Indigenous wild fruits and vegetables are linked to agriculture (agro-forestry) (Prain, Fujisaka & Warren, 1999:175). Agro-forestry include fruit trees left in the fields, colonizing species of annuals (weeds) harvested from the fields as relish, and fruits – bearing shrubs occurring in heavily unutilised natural grassland. Indigenous wild fruits and vegetables play an important part in the diets of the rural people. The most commonly consumed indigenous wild fruits are "Forest milk berry (Manilkara discolour); Wild custard-apple (Annona senegalensis); Wild medlar (Vangueria infausta); Marula (Sclerocarya birrea); Waterbury (Syzygium corda-tum); African mangosteen (Garcina livingstoneii); large num-num (Carissa macrocarpa) and Wild date palm (Phoenix reclinata) which is also tapped for palm wine.

Quin (1959) classified indigenous food gathering in terms of edible wild plants; edible wild fruits, edible insects, edible wild animals and further described the methods of gathering, processing and food preparation using indigenous gathered foods. According to Quin (1959) Sekhukhune land (part of the research area) is rich in the following indigenous wild fruits: *Chrysophyllum magaliesmontanum Sond.*

(Sapotaceae) **Mohlatswa** Wild plum; *Strychnos pungens Solered (Loganiaceae)* **Morutloe** Monkey apple; *Vitex pooara Corb. (Verbenaceae*) **Mburo**; *Vangueria infausta Burch. (Rubiaceae*) **Mmilo** Wild medlar; *Dovyallis caffra Sond. (Flacourtiaceae*), **Mohlono** Kei-apple; *Sclerocarya caffra Sond. (Anacardiaceae*) **Morula** Marula; *Opuntia megacantha Salm Dyck (Cactaceae)* **Torofeie/ toro** Prickly pear; *Ximenia caffra Sond. (Oleaceae)* **Ditšhidi/** Sour-plums. Indigenous wild fruits are part of the food systems of the rural communities.

The roots of Mohlopi tree (Bascia albitruncia, white-stem) were dug out, dried, grounded and boiled into porridge especially during famine periods when no crops were harvested (Quin, 1959; Monnig, 1967). According to Monnig (1967:180) Ba-Pedi consumed indigenous wild fruits such as: Mohlatswa (Chrysophyllum magaliesmontanum, wild plum); Mago, wild figs; Mafaya (Ficus sp.); Mabilo (Vagneria infausta, wild medlar); Matšhidi (Ximenia caffra, sour plums); Mofoiye (Opuntia megacantha, prickly pear) and Marula (Sclerocarya caffra, marula). Most of the fruits are picked and consumed fresh. The fruits of Marula tree were preserved and used to make marula beer and the Marula nuts were cracked and used as snacks or added to vegetables as a condiment. The Matšhidi nuts were used in the tanning of hides, while its kernel was burnt to extract the fat, which was used for smearing the body.

Some of the literature reviewed from historical, agricultural, anthropology and sociology on the indigenous wild vegetables revealed that there are twenty- two different types of indigenous vegetables, which are used as a relish (*merogo*) in Sekhukhune land (Quin, 1959; Quin, 1964; Leary, 1964; Franz, 1971). The following indigenous wild plants formed part of the relishes namely: **Theepe** (Pigweed); **Serepelele (**Thorny pigweed); **Lefotosane; Mothuhu; Lerotho**; **Sekalerothoane**; **Serua (**goosefoot); **Monyane** (Black Jack); **Lesese** (Sow thistle); **Lehlanye** (*Vernonia fastigiata*); **Maswi a pudi** (*Ipomoea lugardi N.E.Br*); **Monyaku** (Wild cucumber); **Thagaraga** (Wild cucumber); **Mokiti** (Bitter apple); **Kaukau** (*Coccinia rehmanii Cogn*); **Mosegasegane** (Balsam apple); **Moswe** (Black nightshade); **Tshehlo** (Devil` s thorn); **Selotane** (*Momordica balsamina*). While gathering of wild fruit, insects and hunting wild animals seem to play a peripheral role in food procurement, gathering of wild green vegetables play a vital role in producing

sources of relish in most rural areas (Ogle & Grivetti, 1985). Indigenous vegetables were preserved through sun drying methods and used during winter and dry seasons.

Research conducted by Monnig (1967:179) on the Ba-Pedi of Sekhukhune land, concluded that the following indigenous vegetables formed part of their relishes: Leroto (Gyrandropsis pentaphylla), Theepe (Amarnthus thunbergii, pigweed), Serepelele (Amaranthus spinosis, thorney pigweed), Thagaraga (Cucumis melo), Mokiti (citrullus vulgaris) and Monkgenkgane (Bidens bipinnata, blackjack). The leaves of these indigenous wild vegetables were stewed and eaten as a vegetable or a side – dish with cereal porridge. Women were responsible for their gathering, preparation and serving. The other edible foodstuffs such as fruits and insects had a relatively short seasonal availability per species but vegetables were available for the whole summer season.

According to Harries (1929:62) many tribes in Sekhukhune land (the research area) subsisted almost entirely on indigenous fruits such as Prickly pears and Marula. These are prepared in various ways, and can be made into very strong beer, which is largely consumed by men. Wild fruits are also largely used during famine for the purpose of augmenting the food supply. Most of the fruits are prepared in the same manner as the prickly pear and Marula. The Marula fruit, which rather resembles the loquat, makes a very strong beverage, which is said to be favourable to men.

Food gathering comprised of hunting, fishing and collecting indigenous edible insects, which are commonly found in Sekhukhune land (the research area) and were used as a relish (Quin, 1959, Leary, 1964). The following insects formed part of their relishes: “kgagaripane (*Polycleis plumbeus Guer*.) lebitsi-kgomo (*Sternocera orissa Buq*.), dintlhwa makhura (*Careba vidua Sm*) female, dintlhwa bogwale (*Careba vidua Sm)* male, lekeke/ lemenemene (*Termes badius*), legakgala (*Gynanisa maia Klug*), mmakonokono (*Gonometa postica Walk*), naatla (*Herse convolvuli L.).*), ngwana- mamahlwehlwana (*Bombycomorpha pallida Dist*.), noto (*Cerina forda Westw*.), notoleetsana (*Conimbrasia belina Westw*.), kodi (*Zonocerus elegans Thb*.), sogongwane (*Locustana pardalina Walk*) and mmamphata-kakalana

(*Nomadacris sepmfasciata Serville.* Endemann (1876), Condor (1887) and Lemue (1947) reported the gathering of insects, caterpillars and flying ants as food.

Bodenheimer (1951: 160) did an extensive literature on locusts as food. The locust's invasions were a plague for all agricultural peoples in Africa but a delicacy as a source of food for the Africans. A commonly consumed locust was the dessert locust (*Schistocerca gregaria Forsk*). In South Africa two additional locust breeds, which were utilized as relish, were the brown locusts (Locustana pardalina Wlk) and the red locust (*Nomadacris septemfasciata Serv)*. The Africans used different ways to prepare and preserve them. Some pound them and boil them with milk, others boil and add salt, then fry them with fat from any animals, and others merely roast them over coals and find them excellent. If they are abundantly available they are roasted and dried, then stored and utilized as food in time of need.

Although insects formed part of the diet in most African countries, but their importance in the diet and nutrition of the Africans were never recognized. In tropical countries the insects filled the gaps in the one-sided vegetarian diets. The most commonly consumed insects were termites, caterpillars and locusts. The gathering of insects had often helped to supplement grave dietary deficiencies either at certain regular seasons of the year or in times of emergency such as recurrent droughts. In tropical Africa, female termites with wings are eaten in large quantities when they swarm out of their nests after the first rainfalls in summer. The female termites had swollen abdomens, which are a rich source of fats and proteins (Quin, 1959; Quin, 1964).

According to Monnig (1967:147), "The average knowledge of the ordinary Pedi men and women concerning the fauna and flora of their habitat was truly astonishing. Practically every adult person knows the names of all the trees, shrubs, grasses and other plants in their environment. In fact their empirical knowledge of nature closely resembles a science". Monnig (1967:180) further classified edible insects consumed by Ba Pedi of Sekhukhune land as follows: locusts and grasshoppers (ditšie); ants and termites (ditšhošane); caterpillars (diboko), lebitsi-kgomo (Sternocera orissa) and beetles (dikhunkhwane. The most popular insects were locusts and grasshoppers. In areas where a swamp of locusts invade the community`s fields, the community will

gather them day and night, partly because of their own value and partly to save their crops. The locusts are then roasted or stewed and then dried, and can be enjoyed for months afterwards as a side dish with porridge. The caterpillars were also the most regular seasonal supply of insects.

The most recognised caterpillars were noto, naatla and maagakgale. By far the most important caterpillar was nato or mašotša (Conimbrasia belina, mopani worms). Mopani worms appeared regularly once a season in great quantities. At the height of the season an adult woman can gather as much as forty ponds of worms in an hour. Their stomach contents are squeezed out between the fingers and the worms are briefly roasted or stewed, and then left to dry in the sun. The worms may be preserved for a long time and eaten as a delicacy or as a side dish with porridge (Monnig, 1967:181). Franz (1971) did a study on the traditional diet of Ba-Pedi in the Pietersburg district. He reported the consumption of locusts and caterpillars as a relish. The mostly liked caterpillar was mopane-worms, which is also found in commercial outlets in the villages. Mopane-worms (Conimbrasia belina) were considered a favourite delicacy. According to Quin (1964) four oz. of mopane-worms are rich in calcium, phosphorous, thiamine, riboflavin and nicotinic- acid for an adult.

Honey was regarded as a delicacy food (Bodenheimer, 1951, Quin, 1959 & Monnig, 1967). The wild bee establishes its hive either in a hollow tree or in a crevice in the ground. When the exit of the hive has been discovered in the ground, from which numerous bees are flying, the lucky finder immediately begins to dig down carefully also along the narrow channel until he reaches the honeycomb. If the supply is limited, it is usually removed in total by hand and lifted to the hunter's mouth. If there is plenty the whole of the comb is collected and placed in a food carrier and taken back home. When a hive is located in a hollow tree, the hunter places his ear against the butt and listens; by frequently altering the position of his ears like one undertaking a medical consultation, he can gauge the exact position of the hive by the murmur and buzz beneath the bark. It is then a simple matter for him to cut into the cover and collect the honeycomb. Some of the experienced hunters can smell their way for a considerable distance to a wild-bee hive. Today honey is the most commercialised activity, which is used for income generation.

Hunting involved catching small wild animals and birds as most of the larger animals such as bucks, springbucks, are largely housed in nature conservation parks and the rural communities are not legally allowed to utilize them for food. Hunting small animals and insects was always a task for heard boys and such animals are shared among themselves. Molema (1920:119) did a study of the food gathering activities of the South African Bantus. He concluded that fish and wild pork were regarded as unclean and were not consumed. The flesh of many wild animals, including the wild cat, was eaten. Keyter (1961) did a study on the feeding, customs and food habits of the urban Africans and he concluded that the Ba-Pedi tradition forbids fish as a food although the urban Ba-Pedi are increasingly accepting tinned pilchards, fried fish and chips as one of their popular meal. Franz (1971:1233) indicated that fish was not regarded as food because of cultural taboos. According to Monnig (1967:175), “Fish were often described as snakes of the water and thus despised”. Due to acculturation the current Ba-Pedi community eat canned fish, which is bought from the stores.

The Africans did hunt wild animals both big and small and utilized them as food. They will catch fish and hunt even rats occasionally. The Africans dishes contain ingredients such as insects, insect’s larvae, caterpillars, termites, locusts, rats and small fish. “They hunt all kinds of buck (phala), duiker (phuti), buffalo (nare), zebras, porcupines (noko), wild boar (kolobe ya naga) hares (mebutla), rats (lekganthwane) mice (legotlo), birds of all kinds including nestlings, frogs, barbell, locusts, grasshoppers, flying ants and wild honey” (Bodenheimer, 1951:138). Foods were gathered, processed, preserved using sun drying methods, stored and utilized for household consumption. One of the objectives of this research was to conduct a comparative study through literature review by comparing the past indigenous food gathering and production activities of the rural communities and compare them with the current food gathering and production activities. Therefore the above literature was used as a base of reference for indigenous food gathering activities of communities in the then Sekhukhune land, which currently in the new South Africa is known as Sekhukhune district of the Limpopo province.

2.2.2 Food production

Schapera (1953) and Grivetti (1976) reported that each tribe including Ba-Pedi formerly had its own territory and land – use was controlled by the chief, through the headmen within each village. They granted each married man residential and cultivating land, which he then apportioned to his dependents. Breutz (1975) mentioned that agriculture was practiced mainly in fields outside the villages. The size of these fields varied between (0,5 ha), but since the adoption of the plough, they have increased the land to between 1-6 ha. A family might own more than one field, in different locations, to overcome the hazards of uncertain rainfall.

The agricultural production of Ba-Pedi of Sekhukhune land (now Sekhukhune district) was mostly subsistence economy (Monnig, 1967:176). Ba-Pedi marked their crop cultivation season by the appearance of certain insects and the growth of certain shrubs which they keenly observed and taken as signs of the start of a production season. The appropriate time for ploughing is marked by the budding of new foliage of certain plants after the winter rest, and mostly after the first rains of the season. The cultivating season was inaugurated by rainmaking ceremonies, organised by the chief. Cultivating started after the first rains in November. The cycle of the cultivating activity was regulated by the chief, whose field had to be worked by certain sections of the tribe i.e. all women within the community, before the whole communities were allowed to proceed with cultivating their own (Schapera, 1953; Quin, 1959).

Ba-Pedi cultivated a large variety of indigenous crop plants such as **cereals** i.e. sorghum (mabele), millet (leotsa) and exotic maize (mahea or mafela). Both millet and sorghum are resistant to drought but easily attacked by birds. The next important crop to the cereals are **cucurbits** namely: pumpkins (mafodi); citron (marotse); watermelon (magapu); **gourds** which are also categorized in to two groups namely calabashes (digo, magapa, mekgopu) and “maraka”: as gourds, which are eaten while still tender. The Ba-Pedi also cultivated **legumes** such as cow-peas (monawa); bambara ground nuts or njugo beans (ditloo marapo, photla) and mung beans (dihlodi). The other crops, which were cultivated by Ba-Pedi was

sweet reeds (dinyoba, ntsho) and tobacco. Ba-Pedi had three sowing methods of crop production namely:

- The seeds were spat out into holes made by fingers or
- Dropped and trodden into the soil by foot, or
- Scattered by hand by a woman followed by a line of women who cover the seeds with hoes (Quin, 1959; Monnig, 1967).

All types of seeds were sown together, with the exception of sorghum, which is sown individually on separate land. No kind of fertilization was used. The droppings of cattle and the ash of weeds, bush wood and trees burnt down in clearing the fields served as an indirect form of fertilizers. To ensure good indigenous crop production in some years the land was left fallow for a few years.

Khumbane (2004:45) did a qualitative study on the traditional knowledge of Ba-Pedi, paying particular attention to their social food production activities using a seasonal calendar. She concluded that the ploughing season was marked by the first rain-fall in **August** and this was called “kgogola mmoko”. The significance of this was that all crop wasted after harvest will decompose, grains scattered all over after thrashing the corn will germinate. Wild green vegetables (merogo) will grow in the fields. The next step was to carry krall manure from cattle, goats, sheep and donkeys to scatter throughout the fields in preparation for ploughing, ensuring that the green germinated seeds and manure will be turned down to decompose. When this happens the chief called for a sacred ceremony to bless the seed. This activity happens in **September**.

Khumbane (2004) further indicated that the custodians of the ritual in the form of the tribal traditional healer would perform an environment cleansing ceremony and only the old ladies and young girls would be dressed up in traditional clothes and carry water from the river or wells to the Chief’s kraal. The Traditional healer would then perform the ritual and after which he would lead the cleansing activity into the veld to collect any foreign materials, dirt and any rubbish to be burnt at the Chief’s kraal. The cleansing ceremony was followed by indigenous dancing and feasting. As soon as the rains falls the ploughing was commenced. The ploughing activities of Ba Pedi were carried on until **December** and **January**. The main crops such as sorghum,

millet and maize were planted first, then the process of planting in between the main crop happens during weeding time when the main crop has grown higher so that the creeper crops covers the soil to suppress weeds and also protect the soil from extreme heat.

The history of the use of the ploughs in South Africa dates from about 1863 (Harries, 1929:61). Prior to these date cattle were never used as drought animals. The women did the tilling by hand, with indigenous hoes made of rough iron and a wooden pole. The endless tasks of weeding, harvesting of various crops, and chasing of birds when the cereals come into seed were tasks left to women and children (Monnig, 1967:161). Despite the use of advanced technology in food production such as tractors, poor rural farmers still rely on animal traction as a means of food production and transportation of farm produce from the field to the household and even to commercial outlets. Animals, which are mostly used for food production activities are donkeys and cattle. The whole production process need indigenous know how.

Pre-colonial agriculture in Lebowa (currently, Lebowa forms part of Limpopo province and Sekhukhune district as a subsystem of this area) like any other part of the South African provinces was characterised by a “pastoralist-cum-hoe” mixed subsistence economy, with maintenance of soil fertility through a system of bush-fallowing. This system was well adapted to Lebowa’s unreliable rainfall, frequent droughts, poor erodible soils, and it provided subsistence with minimal effort. Ash from burnt vegetation and kraal-manure were used as fertilizers and soil condition was maintained by turning the surface during the growing season. According to Norman, Snyman & Cohen (1996:138) kraal manure is “traditional organic fertilizer”, and mixed cropping methods of production were widely used. Quin (1959) reported the use of indigenous medicinal plants to ensure good harvest while Burchell (1953) reported the use of magical means to ensure good harvests, pest control and to counteract sorcery.

The Ba-Pedi tribe are agriculturalists and stock farmers combined (Harries, 1929: 61). The women do most, in fact nearly all, of the work in the fields, whilst the men attend to the cattle and goats. Molema (1920) also studied the agricultural practices

of the Bantu and concluded that they produce millet, sorghum and maize crops with vegetables such as pumpkins, melons, beans and cowpeas. Agricultural activities were allocated to women while men did the fighting, hunting and trading. Ba-Pedi tribes produced summer crops such as maize, sorghum, millet, ground- nuts, pumpkins, sweet reed, beans and water- melons. Holm and Marloth (1940) did an extensive study on the production of bambara groundnut or njugo bean, their findings indicated that they are produced in Sekhukhuneland (which forms part of the research area).

Franz (1971:1232) outlined the principal agricultural crops of Ba-Pedi and classified them as **cereals** such as: sorghum (Mabele), millet (leotsa) sweet reed (nyoba); **beans** such as: cow peas (dinawa); bambara nuts (ditloo) and mung beans (dihlodi); **gourds** such as citron (lerotse), watermelon (legapu), calabash (leraka) pumpkin (lefodi) and gourds which were used to make food utensils (sego, phafana, kgapa and morutlo). The leaves of cowpeas, citron, watermelon and pumpkins were used as vegetables when fresh or dried. Walker (1992:1395) reported the production and consumption of the same indigenous crops. Khumbane (2004) outlined different food styles of cultural groups of the indigenous people of South Africa, which vary from sorghum, millet, mealie-meal, processed mealies, dry beans, peanuts, water melons, calabashes and pumpkins which also give green morogo (indigenous vegetables). All these crops are produced through multi-cropping in dry land fields.

Farmers traditionally maintained their indigenous crop varieties by keeping household seed stocks and by obtaining seeds through traditional family and community networks and through exchanges with nearby communities (Grienier, 1998:8). A typical example is the Dinka women who according to Prain, Fujisaka & Warren (1999:147), had six different sorghum varieties in her clay storage bin, each one with its own advantages and disadvantages with respect to cooking qualities, taste, water-logging, resistance against birds attack and so on. Such indigenous knowledge is essential if incorporated into the existing extension programs. The Ba-Pedi had six different types of sorghum namely: “motleriane”, “morolong”, “malehlwane”, “morudu”, “mmamothapudi” and “mohlokahlong” all with advantages and disadvantages in terms of taste, colour, popularity, birds attack and total yields per plot (Quin, 1959:27).

Literature reviewed indicated that the indigenous method of crop production was multi- cropping. Multi cropping is however, a more inclusive term. Rural small scale farmers plant many crops together on the same plot to reduce labour expenditure and also to combat the problem of poor rural marketing and transport structures while meeting family dietary and survival needs in a seasonal situation (Atte, 1992:11). It is increasingly evident that Africa farmers possess indigenous knowledge of many of these practices and continues to use them in the absence of sufficient modern fertilizers and technology to produce food (Norman, Snyman & Cohen, 1996: 137). However, little official attention is paid to this knowledge or how it may be incorporated into viable strategies for improvement of food security and sustainable agriculture.

Rural farmers possess indigenous indicators of knowledge, which enable them to determine favourable times to prepare, plant and harvest gardens or field crops. They also possess indigenous knowledge on land preparation practices, indigenous ways to propagate plants, seed storage and processing (drying, threshing, cleaning and grading), seed practices, indigenous methods of sowing (seed spacing and intercropping); seedling preparation and care; farming and cropping systems (for example, complementary groupings); crop harvesting and storage, food processing and marketing; pest-management systems and plant-protection methods (Grenier, 1998: 3).

2.2.3 Weeding, harvesting, processing, preservation and storage

(i) Weeding

Once the crops have been sown, the endless tasks of weeding, harvesting of various crops, and chasing of birds when the cereals come into seed, begin. These tasks are left completely to the women and children. Weeding was usually done three times during the season. At first, when the young seedlings are thinned out by hand, small weeds are pulled out simultaneously. Once the crops are established, weeding is done by hoe. Mechanical weeding is impossible due to the method of sowing which scatters the seeds irregularly. Working parties known as “letšema” (co-

operative work) were organized to speed up the weeding process (Monnig, 1967). According to Khumbane (2004:45) weeding was combined with the process of planting in between the main crops where the creeper crops such as calabashes, gourds, water melons, citron and pumpkins were planted using a hoe. The creeper crops were grown to cover the soil, to suppress weeds and also to protect the soil from extreme heat.

(ii) Harvesting

The ritual ceremony of the “first fruits” (go loma ngwaga) was held by the chief for all his villages prior to the harvesting of any fresh produce such as gourds and pumpkins (Quin, 1959; Monnig, 1967). After this ceremony women and girls will start picking fresh gourds, cowpeas and pumpkins. The harvesting activities are characterized by the picking up of indigenous vegetables such as pumpkins leaves; watermelon leaves; gourds leaves; cowpeas leaves and citron leaves (merogo). These leaves were further processed as “mokhuša” or others “legwahla”. According to the seasonal calendar of Khumbane (2004), the harvesting of fresh produce such as vegetables take place in **February** and continues into **March/ April,** while Monnig (1967) indicated that the harvesting of gourds start in January with a feast from the chief’s kraal.

Age and sexual division of labour existed, with men doing the field clearing, ploughing and sowing, women and children the weeding and harvesting (Quin, 1959; Monnig, 1967). The fruits heads of cobs are broken off by hand, and carried home in baskets. Beans, sorghum and millet are placed on a special dry platform (seboya) to dry after harvesting. The threshing, winnowing and grading was normally done by women using hand flails and flat woven baskets. The threshing process involved spreading the dry pods on the threshing platform (seboya) and the dry pods were beaten with a threshing stick (sefolo, morogo) to free the seeds. Winnowing process involved whisking the ponds in a flat woven basket using air to blow out any impurities. According to Khumbane `s seasonal calendar (2004), **May** and **June** were the two months, which were used to prepare the harvesting process. Women prepare diboya (threshing platforms) with special anthill soil, water and cow dung, while men prepare (weave) silos (sešego) to store the crops.

Harvesting is a process, which involve pre-drying of crops in the field; threshing; winnowing; drying; carrying the crops to a household storage or to a commercial storage. Depending on the type of the crop, harvesting sometimes involve primary processing such as: cleaning, grinding, hulling, pounding, milling, tempering, soaking, parboiling, drying, sieving while secondary processing involves cooking, baking, frying, extruding, blending, fermenting and roasting (FAO, 1997:181). The threshing of sorghum, millet or beans was normally done by women using hand flails. The crop such as sorghum was then winnowed, ashed (for prevention of weevils) bagged and transported to the granaries at home for storage (Schapera, 1953). In areas where production is high, packaging and marketing form part of the harvesting process. For smallholder farmers and households, harvesting will be a process leading to utilization of the produced crops or vegetables at household level.

(iii) Processing, preservation and storage

Indigenous technological tools were used in processing and drying the field crops. Indigenous vegetables such as cowpea and pumpkin leaves were gathered, cleaned, dried or sometimes cooked and dried in the form of small balls known as “mokhuša”. Quin (1959) mentioned that local melons were sliced and sun-dried to preserve them for winter use. Campbell (1815) and Lewin (1940) also mentioned that local melons were sliced and sun-dried to preserve them for winter use. Gourds were processed to make drinking, storage and serving vessels. Such a process needs indigenous know how to undertake it. According to Franz (1971) the leaves of cow peas and those of other melons (motšhatšha) were cooked with citron and mashed, to make small pellets which were sun dried for future use i.e. during winter. This product is known as “mokhuša” and when vegetable (morogo) is needed it was boiled (go khuša) and served with porridge.

Indigenous vegetables (morogo) were processed in two ways such as cooking, mashing, kneading, moulding into small pellets and sun drying or picking and shade drying. Dried vegetables were stored in big clay pots, which were sealed with fresh cow dung to prevent pests from destroying it (Khumbane, 2004). According to Khumbane (2004), foods such as green mealies, green cowpeas and bambara

groundnuts were cooked in big pots with their skin on and dried. They are then stored away in big clay pots or bags for future use. This method of preservation controls pests. The household members can re- cook when they want to eat.

Sorghum if highly produced was stored in a “sešego” (Quin, 1959; Monnig, 1967; Tieku, 2000). Authors such Monnig (1967) reported that cereals are stored in very large baskets which were kept in special huts, while Quin (1959) reported that the grains were treated with aloe ash, stored in large woven baskets (sešego) and the “sešego” was buried in the cattle kraal. Aloe ash was used to preserve sorghum, while “sešego” was used as a major food storage basket especially when buried in the cattle kraal and this method could store sorghum over a long period of time. According to Khumbane (2004) crops stored in a “sešego” basket can last up to two to three years. Aloe ash was applied to some of the sorghum for prevention of weevils. Tieku (2000:35) also stressed that the aloe (Aloe castanea) plant which is wildly growing in the Limpopo Province of South Africa has been successfully used in common practice to protect cereal grains against insects in various parts of the province.

Other crops were stored in clay pots, bags and stored in a cool food storage house roofed with thatch to maintain proper temperatures for storage purposes. According to Harries (1929:62) the Ba-Pedi and most of the Black South African ethnic tribes, usually store most of their grain in large well made baskets, which are capable of holding about thirty or forty bushels. The baskets, which are called “sešego”, are plated by men, and very often form the subject of a “letšema” (traditional co-operatives), in the event of which only the men will attend. Sorghum and cow peas can be preserved by applying aloe ash on them to prevent weevils destroying them. Preserved seeds can then be stored at room temperature and be utilized as seeds for the following season (Quin, 1959; Monnig, 1967). Households make choices on how much to store and how much to sell depending on the market price, their own consumption needs, storage facilities and their needs for immediate cash. Post – harvest handing and storage of cereals and legume grains is important to avoid grain loss and waste.

Indigenous methods of preserving and storing grain varied from grass baskets, which were capable of taking ten to twenty bags of sorghum and or millet, buried in the kraal. According to Khumbane (2004), “the corn on the edge of the grass basket would soak up but would not germinate and would have a taste and smell of kraal manure. While a research conducted by Tieku (2000) indicated that the corn buried in a “sešego” will not change in physical structure, moisture content and taste and could be stored under the cattle kraal for a period of ten years or until needed. Seeds of all the crops produced were stored in clay pots with the aim of utilising them in the next production season.

2.2.4 Food preparation, utilization and consumption

Food processing at household level involved grinding cereals with a grinding stone, stamping with mortar and pestle to form a variety of products such as mealie meal, samp and mealie- rice (Khumbane, 2004). According to FAO (1997:47) food utilization and consumption include those involved in the preparation, processing and cooking of food for home and community levels, as well as household decision-making regarding food choices. Women and girls were more involved with food preparation and serving.

Food utilization had two folds such as household food utilization and consumption on the one hand and community food utilization and consumption on the other hand. At household level all the food produced, prepared and culturally acceptable for household members were consumed i.e. foods such as “tšhima” (a mixture of sorghum, cowpeas and bambarra groundnuts), “kgodu” (citron cooked and mixed with sorghum meal), “dikgobe” (bambarra groundnuts and sorghum corns) and sorghum meal and relish (Quin, 1959).

Franz (1971) categorized food utilization of the Basotho into three categories such as cereals namely sorghum, millet, sweet reed and maize; beans such as cow pea, mung beans, bambarra groundnut and gourds such as citron, water melon, calabash (leraka). Leraka (rough calabash) was eaten as a vegetable and as a fruit. The fruit of a smooth large calabash (sego, phafana, kgapa, mokgopu) were dried and made

serving utensils. Out of sorghum different dishes were prepared such as porridge, sour (ting) soft porridge and sorghum beer. Vegetables both cultivated and gathered are used as a relish, seasoned with salt and always served with porridge.

Coetzee (1982: 68) did a study on the roots of traditional African culture and concluded that the Ba-Pedi like most of the African tribes in South Africa utilize sorghum for beer as well as porridge and other dishes. The Ba-Pedi eat sweet reed as a snack because of its sweet taste. Citron is also used to prepare citron porridge and can be sliced, cooked and consumed. Citron/ melons are regarded as a popular crop because they are resistant to draught and can be stored for a long period of time. All the peas and beans or legumes are used to prepare a number of dishes. The pumpkin is prepared in many different ways such as a vegetable (its leaves), can be mixed with cereal as porridge, the young fruits are stewed, a delicious dish is prepared from the flowers and the seeds are fried and served with porridge.

Community food utilization and consumption imply food prepared for special occasions such as funerals, weddings, initiation ceremonies and church gatherings. In most of the occasions women are mostly responsible for food preparation and serving. Communal activities such as “letšema” (traditional cooperatives which were socially constructed) were used as a source of human resource for food preparation activities such as the preparation of a wedding or a funeral. Any household, which organized “letšema” for food production purpose provided all the participants with food. Funeral, wedding and other special events were celebrated with food prepared for the community i.e. the slaughtering of a cow, preparation of traditional dishes and the serving of indigenous sorghum beer during weddings and other special occasions. All these activities need indigenous knowledge systems to plan and run them.

Indigenous foods were prepared and served using indigenous food preparation and serving utensils. Quin (1959) found that the traditional cooking and eating utensils of the rural communities in Sekhukhune land consisted of clay cooking pots, clay beer and water pots, gourds (calabashes for beer and water), wooden bowls and special small clay bowls for relishes. For stirring, traditional wooden spoons and wooden stirring sticks were used. Numerous other items were used in the preparation of food

such as grinding stones, grass mats, beer strainers, winnowing baskets, wooden mortars and pestles. These indigenous food storage, preparation and serving utensils were also gender biased because wooden utensils and granaries were mostly done by men while clay, gourds and grass utensils were women` s creations. It was through the process of socialization that both men and women learned indigenous skills to be able to create indigenous technological tools essential to address both community and household needs.

2.3 Household food security

One of the research objectives was to assess the contribution, which indigenous knowledge and indigenous food systems could make to household food security. Household food security refers to whether a household is able to access a sufficient supply of food of sufficient quality to meet its needs throughout the year (Howard, 2003:87). Household food security in the South African context is seen to encompass the availability, accessibility and utilization of food by households (Food Security Working Group, 1997:4). This research focused on addressing issues of indigenous knowledge systems with specific reference to food gathering, production, processing, preservation, storage and utilization in order to ensure household food security.

According to Frankenberger (1992) land ownership, land use practices i.e. indigenous multiple cropping, and possession of livestock, are all indicators for food security. May, Rogerson and Vaughan (2000b) in a study conducted in South Africa to look at poverty and inequality issues also identified multiple crop farming systems as important for food security of many poor households in rural areas. Multiple cropping is part of the indigenous knowledge systems and has a potential of increasing variety in food systems of smallholder farmers and the poor.

In recent decades, climatic change and other natural hazards have been increasing in severity, affecting many countries around the world and resulting in severe food shortages for their populations. For centuries, “indigenous wild plants” have been important source of emergency food that acts as a buffer against food shortages by

ensuring nutrition and household food security (Howard, 2003:83). Indigenous wild foods coupled with indigenous cultivated crops and animal husbandry, were of major importance for the livelihoods of rural people.

According to Khumbane (2004:44) food security means that the communities in rural areas are able to produce food, preserve and store for the future. The future is not just to have enough for a year, but also to take into account the following years from two to three years and beyond (that is in case of drought). She further indicated that food security means "taking into account basic food needs which culturally sustain food requirements that the households are accustomed to". For the indigenous people of South Africa staying in rural areas, food security imply multiple cropping in dry land fields of a variety of crops such as mealies, sweet reeds, sorghum, millet, cow pea, peanuts, bambarra ground nuts, dry beans, mung beans, water melons, citron, pumpkins and the traditional variety of creepers which gives green "morogo" (vegetables) for a long period stretching into winter. "Without accessing animal products food production is incomplete. Animal husbandry is an integral part of food security to ensure that the households have milk, meat and eggs. The question is, is it still possible for the majority of the households in rural areas of South Africa today" (Khumbane, 2004:44).

Food insecurity and poverty are among the most pressing social issues in South Africa. The majority of the rural population are subject to increasing poverty, with about half of the South African population living below the poverty line (Lemke, 2001). About 44% of the South African population are considered food insecure (Lemke, 2001). While food insecurity may lead to, and is often characterised by hunger, its principal meaning refers to the risk of people being hungry. Therefore, food security is not just about the absence of hunger, but it is about the absence of risk relating to adequate food consumption. This also entails the way in which food or other resources to get food are obtained. It further depends on how available resources are used and distributed within the household, which is addressed by the concept food utilization in this research. The necessity of revealing the marked differentiation in resource access and decision making in the household sphere and also between socially connected households has been indicated as of outmost importance (Lemke, 2001).

The term food security has recently been replaced by nutrition security or food and nutrition security as this term more accurately reflects the complexity of nutritional problems beyond food supply and access to food (Lemke, 2001:5). There has been much debate about the concept of food security (Maxwell and Frankenberger, 1992). There are however, common themes, which cut across discussions on intra-household bargaining, nutrition adaptation, livelihood security, ecological resilience and questions of indigenous foods, culture and perception (Maxwell and Frankenberger, 1992). To ensure sustainable household food security, rural households has developed coping strategies such as gathering indigenous plants and producing indigenous food crops.

Coping strategies in all of the above issues are related to the vulnerability concept (Chambers, 1983). It is assumed that people strive to achieve a situation of livelihood security and that they deploy all kinds of strategies and use resources to this end (Frankenberger, 1992:90). Coping is an array of strategies adopted in response to crisis. The aim of coping is to maintain the various objectives of the household, with food consumption and health being more immediate objectives and livelihood security and status being long-term objectives. Coping strategies such as the use of indigenous foods, acquiring them through gathering and production methods, indigenous food processing, preservation and storage systems are used by the rural communities to maintain their current levels of food consumption thus ensuring their livelihood securities.

Coping strategies as part of livelihood security are often neglected in addressing food security. According to Frankenberger (1992:90), coping strategies vary by region, community, social class, socio-cultural acceptability, ethnic group, household perceptions, gender, age, seasons such as the availability of indigenous vegetables in summer. Therefore, their use as indicator is location-specific and one cannot regard coping strategies isolated from indicators of food security. Therefore, indigenous food systems whether obtained through food gathering or production are an essential component of food security and above all a coping strategy for the survival of the rural households.

2.4 The importance of indigenous knowledge and indigenous food systems in Agricultural Extension

According to Botha as cited by de Beer (2000:60-61) there is no single definition of agricultural extension that is universally accepted or applicable in all situations. Extension remains a dynamic and ever changing exercise. Different definitions of extension contain one or more or a combination of the following: it is an intervention; voluntary change is essential; motivating; enabling and providing insights; forming opinion and better decision making; mutual and reciprocal learning; communication takes place; it is an ongoing and continuous process characterised by giving and sharing of knowledge; and agricultural technologies play a major role (de Beer, 2000:60-67). It is the sharing of knowledge in extension, which forms the basis for tapping indigenous knowledge in food systems of rural communities, which if known will be incorporated into the current extension programs.

The historic negligent of indigenous foods both wild and some of the cultivated crops in the agricultural context and extension in particular is in part linked to the fact that gathering, weeding, harvesting, processing, storing and utilization i.e. food preparation is the work of women and children, and thus receives less attention relative to men` s activities (Howard, 2003:101). It is also partly due to the fact that much of women` s food gathering is oriented toward daily domestic consumption, which can be easily overlooked by outsiders (Howard, 2003). However, there is a general preconceived notion that farmers are males, and the emphasis in agricultural research and extension is on increasing staple crop production for the market, this have both played significant roles in keeping women's work with indigenous plant foods hidden (Howard, 2003).

One of the perspectives of agricultural extension is the farming systems approach to technology development and transfer. The farming systems approach to technology development and transfer (Matata, Anandajayasekaram, Kiriro, Wandera & Dixon, 1995), is an approach which takes into consideration the inter-relationship between technologies and the environment, economy, culture, politics, beliefs and attitudes of the rural societies which, to a larger extent, determine the decision made by small-

scale farmers. This approach touches on the environment, culture, beliefs and attitudes, which are a component of the indigenous knowledge systems of the rural communities. This approach is participatory and it helps to outline the linkages between research (the indigenous knowledge systems in food gathering and production of selected rural communities in Sekhukhune district), the local extension services and programs, and the agricultural development of the rural communities.

According to Swanson, Bentz and Sofranko (1997:13) technology transfer as an approach in extension which created a general faith in science and the commitment to modernization, led to discrediting indigenous knowledge. It is against this background that this research was conducted with the aim of investigating the role of indigenous knowledge systems in food gathering and production so that data collected through research could be used as a feedback to the current extension programs of Sekhukhune district.

In South Africa and Sekhukhune district in particular, the total rural population consist largely of women yet most researchers overlook their indigenous knowledge partly because of lack of appropriate policy measures to incorporate indigenous knowledge systems into the agricultural extension programs. One of the challenges facing the farming system approach practitioners is to strengthen the indigenous knowledge system and to show how this impressive body of knowledge and experiences can be effectively incorporated and applied to improve the existing production system of the smallholder farmers.

Research conducted by Turner (Howard, 2003:133-149) in India revealed that women's indigenous knowledge in agriculture and plant management gives them practical skills for survival and some of these skills ensure their household food security. Examples of such skills are:

(i) Familiarity with ecosystems, weather patterns and the starting of a new season for crop production,

(ii) Understanding of ecological succession, habitats and lifecycles of resource species, and of the ecological indicators of these phenomena such as their knowledge of indigenous vegetables and when they should be gathered,

(iii) In-depth knowledge of names and categories of indigenous culturally important plants,

(iv) All manner of survival skills, including knowledge of wilderness and rural survival, recognition of poisonous and/ or palatable wild plants, knowledge of childcare and household management skills,

(v) Indigenous knowledge and techniques required for harvesting and processing foods i.e. dehydrating, smoking, drying, fermentation, materials and tools to be used, storage and weaving techniques,

(vi) Knowledge of various types of timber and fuel and where to find these, and of how to kindle and maintain fire for food preparation,

(vii) Knowledge of nutrition, foods and famine foods, including quantities required for preservation, food safety and potential toxicity of foods,

(viii) Indigenous cultural knowledge and understanding of social protocols, including rules relating to use and proprietorship of resources, privately held and confidential knowledge, family and clan, clay pots, gourds, baskets and mats designs, songs, names and dances, and means of teaching, sharing and acquiring knowledge in culturally appropriate ways. Such indigenous knowledge systems, is essential if tapped and brought into extension programs.

The above indigenous knowledge skills are regarded as cultural worldview and are reflected in the ways in which plants are harvested, in the ceremonies and rituals enacted at the time of puberty, childbirth, marriage and death, in the ways in which women relate to one another, and in how their individual knowledge and experience is shared. Women's knowledge is customarily passed on from one generation to the other through the process of socialization (Howard, 2003). This research was conducted with the aim of comparing the indigenous knowledge systems in the field of food gathering and production as recorded in literature and the current knowledge systems in Sekhukhune district with the aim of incorporating the existing knowledge systems in research and extension programs but depending on the final outcomes of this research process.

2.5 Summary

This chapter focussed on the review of literature related to the study. It dealt with aspects of indigenous knowledge systems in food gathering and production with specific reference to gathering foods such as vegetables, fruits, insects, birds and small animals. The chapter further expanded on food production, weeding, harvesting, processing, preservation and storage. Food preparation, utilization and consumption were outlined. An attempt was made to indicate the relationship between indigenous knowledge systems, household food security and agricultural extension.

With this literature as a background, the next chapter focuses on the specific area where the research took place and the methodology used in collecting and analysing the data.

CHAPTER 3

3. METHODOLOGY

3.1 Introduction

This chapter is designed to give a brief orientation to the reader about the research area (Sekhukhune district in Limpopo Province), its demographic information and natural resources such as: vegetation, rainfall, temperature, soil types and land use. The chapter also discusses the methodology used in selecting the population of the study; data gathering techniques (qualitative and quantitative); sampling procedures; data collection process, data analysis and interpretation processes.

3.2 Demography of the research area

South Africa has nine provinces namely: Eastern Cape, Western Cape, Northern Cape, Free State, Kwa Zulu-Natal, Mpumalanga, Gauteng, North West and Limpopo province. South Africa is a dry country, with 80% rainfall during the summer months of October to March, much of it accompanied by hail and thunderstorms. The average annual rainfall is only 464mm, against a world average of 857mm. In total, 65% of the country has an annual rainfall of less than 500mm, which is regarded as absolute minimum for dry-land farming (Lemke, 2001:19). South Africa is periodically afflicted by prolonged drought, often ending in severe floods (Anon, 1995).

Limpopo Province has been geographically segmented into six districts namely: Mopani; Capricon, Bohlabela, Waterberg, Vembe and Sekhukhune. The research was conducted in Sekhukhune district, which is a subsystem of Limpopo Province. Limpopo Province has a total land area of 116 824 square kilometres occupying 9,6% of the total surface area of South Africa (Development Bank of Southern Africa, 1998). Limpopo Province has by far the highest population of rural dwellers in South

Africa (De Villiers, 1995). This is reflected in the low human development index in the province.

Employment opportunities in the rural areas are very limited or non-existent. The unemployment rate in Limpopo Province is 46.1%. In comparison with the other provinces, this is the second highest unemployment rate, after the Eastern Cape (48.5%), KwaZulu-Natal (39.1%) and North West Province (33.9%) (Lemke, 2001:44). Illiteracy amongst the adult population is 74, 3%, which is well below the official national average of 82, 8%. Many of the illiterates are the aged and women in the rural areas (Development Bank of Southern Africa, 1998:5). The labour force participation rate in Limpopo Province was the lowest of all provinces and can be attributed to the relatively large proportion of women who are either engaged in subsistence agriculture or supported by relatives who work elsewhere or depend on pension grants to ensure household food security (Development Bank of Southern Africa, 1998:7).

The major language spoken in Limpopo Province is the Northern Sotho/Sepedi. This is spoken by approximately 62% of the population. Northern Sotho language is followed by Xitsonga (26,5%). Afrikaans is spoken by 3,6% and a variety of other languages are spoken by 8% of the inhabitants, while 11% speak Tshivenda (Development Bank of Southern Africa 1998:4). The research area Sekhukhune district has the highest Northern Sothos, which are called Ba-Pedi. It is estimated that the total population of part of Sekhukhune district is 743 000 people both in Nebo and Mamone areas only (Development Bank of Southern Africa, 1998:4).

3.3 Sekhukhune district – The geographical perspective

3.3.1 Geographical location of the research area

Sekhukhune district is geographically subdivided into five municipalities namely: Makhuduthamaga, Groblersdaal (old Nebo), Greater Marblehall, Fetakgomo, and Tubatse. All these municipalities are located in the Southern region of Limpopo Province now called Sekhukhune district. This research project was conducted in

selected villages in Greater Mablehall, Groblersdaal and Makhuduthamaga municipalities.

3.3.2 Natural resources

According to the Development Bank of Southern Africa (1998:13) Sekhukhune district consist of two types of vegetations, namely: pure grass-veld type in the western portion and the tropical bush and savannah type in the northern-eastern portion of the region.

The region has a summer rainfall and receives 90% of its total annual rainfall during the period of October to March each year. If an annual rainfall of 500mm is the accepted norm for successful summer grain crop production, then Sekhukhune district could be regarded as unsuitable for crop production. According to the Development Bank of Southern Africa (1998) the major rainfall received in the area is between 300mm and 4000mm per annum (pa). This is experienced by about 90% of the area, except the southern portion of the region, which receives slightly higher rainfall of 400mm and 450mm. The rainfall pattern is suitable for the survival of indigenous crops such as sorghum and millet.

Sekhukhune district have extreme fluctuating temperatures between 1 degree Celsius to 36 degree Celsius in the winter, and summer months respectively. As temperatures can be as high as indicated above with an average evaporation of 1 750-2 500mm per annum leading to high humidity, summer days can be very oppressive (Development Bank of Southern Africa, 1998).

Two major types of soils are identified. In the northern part of Sekhukhune district there is a red massive rather weak structured soil with high basic status with a depth of 450mm-750mm (Development Bank of Southern Africa, 1998). In the southern part of the region about 30% of the area, are found rocks with limited amount of soil. The depth being less than 450mm. The clay content of the soil in both North and South portions of the region is between 15 and 35% (Development Bank of Southern Africa, 1998). According to Quin (1959:17) the soil in Sekhukhuneland was classified into two sections namely sub-tropical black clay soils and grey ferruginous lateritic

soils. The Ba-Pedi tribes are conversant with the basic differences between soil types and classify them as follows:

Lešikihledi: Sandy soil
Mehlabane: Sandy loam soil
Seloko: Clay soil

The cropping qualities of the various soil types are fully appreciated by the Ba-Pedi. The sandy soils are avoided on account of their relatively low fertility and whereas the clays are famous for their good crops in a favourable rainy season, the relatively low moisture requirements of the loams are fully appreciated among the Ba-Pedi in Sekhukhuneland (Quin, 1959). Sekhukhune district consists of forests and woodlands where indigenous fruits and vegetables are gathered.

3.4 Choice of research area

Limpopo province was chosen because it is one of the provinces with the highest poverty levels. According to May (1998:2) “poverty is deepest in Eastern Cape, Free State and Limpopo Province”. Sekhukhune district in particular was chosen because it was accessible, bigger in size and diversity and rich in indigenous wild and cultivated food crops and it resembles typical rural life, which is characterized by farming and food gathering as part of their livelihoods. It was also chosen because of its proximity to the University of Limpopo and also accessible to the researcher. The researcher has previously worked in this region for a period of seven years and facilitated community outreach programs, which helped the researcher to create rapport with the communities. This also helped in gaining acceptance by the community people who volunteered information. The rapport created and the knowledge of the local language (Northern Sotho), were essential tools needed to facilitate the research process.

The population of Sekhukhune district is homogeneous mainly Sotho (Ba-Pedi) in origin, with a negligible number of Venda, Tsonga and Ndebele speaking people. The communities practice mixed cropping which they use to produce crops for

household consumption to ensure household food security. The most commonly produced indigenous crops are: sorghum, sweet reed, millet, pumpkin, maize, bambarra groundnuts, mung beans, cowpea, gourds, watermelon and citron (Quin, 1959). Sekhukhune district is also rich in indigenous wild fruits and vegetables, which are unique and favourable for the study to be conducted and generalizations made for Sekhukhune district.

3.5 Orientation and planning

One of the objectives of the study was to compare the indigenous food systems of Sekhukhune district as recorded in the literature with their current food systems with specific reference to their indigenous food gathering, production, processing, storage and utilization. The study started in January 2004 with extensive literature review of documents/ literature on Anthropology, Sociology, Agriculture and Historical documents of Sekhukhuneland, Lebowa, Nebo, Mamone, which are now inclusively part of Sekhukhune district. Chapter 2 of this research report outlines the indigenous knowledge systems in the field of food gathering and production of the Northern Sothos (Ba-Pedi) as a summary needed for a comparative study. Data collected during the literature review was then used as a base of reference in the operationalisation of the research process i.e. designing the research instruments.

The researcher conducted consultative meetings with heads, supervisors and managers of the extension officers in Sekhukhune district to seek approval to conduct the first and second stage of the research process. Stage 1 of the research process was to conduct a workshop with extension officers stationed in Sekhukhune district. The objectives of the research were communicated to the Agricultural managers and heads of extension services in Sekhukhune district (with its head offices in Lebowakgomo). An agreement on the date of the workshop between the researcher and the Sekhukhune extension staff was reached leading to Stage 1 of the research process.

Literature reviewed helped the researcher in preparation for the workshop to design a probe questionnaire and a check- list, which were used to guide the proceedings of the workshop. In order to save time for official hours on the part of the extension officers a one-day workshop was conducted at Tompi Seleka College of Agriculture on the 30th June 2004. The participants of the workshop were thirty-nine extension officers from different municipalities of Sekhukhune district and three of their seniors/ managers leading to a total of 42 participants.

The purpose of the workshop was to refine the research instruments, to create awareness to the extension officers that research will be conducted in their area of work and mostly to gather data on indigenous food gathering and production from extension workers as informants for this research process. Rather than conducting research in isolation, the researcher involved extension workers in the initial stage of the research process with the hope that the results of the research will be communicated to the extension workers who will in turn communicate the results back to the households and small -holder farmers of Sekhukhune district. With the permission of the managers of the extension officers in Sekhukhune district, purposive sampling was used to select a sample out of the population of extension work force of Sekhukhune district.

Purposive sampling method is based on the judgement of the researcher regarding the characteristics of the representative sample. A purposive sample is chosen on the basis of what the researcher considers to be typical units (Bless and Higson-Smith, 2000:92). The strategy is to select units that are judged to be the most common in the population under investigation. The primary consideration in purposive sampling is the judgement of the researcher as to who can provide the best information to achieve the objectives of the study. The researcher only goes to those people who in her/his opinion are likely to have the required information and be willing to share it. According to Kumar (1996:162), purposive sampling is extremely useful when the researcher wants to construct a historical reality, describe a phenomenon or develop a theory about which only little is known. For the purpose of this research, extension workers at the grassroots level were selected with the assumption that they will have knowledge on the food gathering and production

activities of their target communities and were therefore selected as informants in the first stage of the research process.

3.6 Data collection and analysis

The researcher used a hybrid of qualitative and quantitative methods to collect data on the indigenous knowledge system in food gathering and production in selected rural communities of Sekhukhune district. Qualitative methods were used to gather data on the indigenous food gathering and production of the communities. Forty-two extension workers were interviewed as informants. The researcher used a workshop method and further divided the participants of the workshop into five focus groups of seven to eight individuals in each group to gather data by recording the data on flip charts. Analysis was done to establish the variations without quantifying the data. The whole process represented **stage one** of the research process. Stage one helped the researcher to refine the research tools (questionnaire) and to be specific in terms of food gathered and cultivated in Sekhukhune district. The results of the works-shop were analysed as stage one (see chapter 4).

Stage two of the research process was conducted in three municipalities of Sekhukhune district and in 13 villages, which were selected by the researcher in consultation with the local extension workers using a cluster sampling method. The principle underlying cluster sampling is to start by sampling a population which is much more general than the final one (Bless & Higson-Smith, 2000:91). The first cluster was that of extension workers (42). The second cluster was a selection of villages. This was done in consultation with extensions workers at the ground and local leadership structure (13 villages were chosen). The final cluster was a selection of farmers within each village resulting in a total sample of 355 farmers. They were randomly selected on conditions that they were willing to be interlocutors of this research. Clustering was chosen because it allowed the researcher to select a sample randomly at each stage. The elements of each population of cluster sampling are qualitatively different but decreasing in their generality (Bless & Higson-Smith, 2000:91).

The participants of stage two of the research process were small-scale farmers both men and women who participate in production and or gathering activities. In each selected village the participants were asked to gather at a common place for the purpose of information sharing. Local extension workers helped the researcher by asking permission from either the chief or and the local leaders ahead of each meeting. Quantitative methods such as structured questionnaires both close ended and open ended were used to gather the data. A total of three hundred and fifty five (355) smallholder farmers in thirteen (13) villages participated in stage two of the research process.

3.6.1 Research design and instruments

A research design is defined as a set of guidelines and instructions to be followed in addressing the research problem (Mouton, 1996:107). The main function of a research design is to enable the researcher to anticipate what the appropriate research decisions should be so as to maximise the validity of the eventual results.

The research necessitated a two- stage design process where data on indigenous food systems was collected from the extension officers as development agents (stage 1) and selected smallholder farmers and household members (stage 2) as recipients of development innovations. The first stage was to collect data using qualitative strategy such as a workshop, focus groups using checklists and probe questions as research instruments. It was only after analysing the information from the first stage that it was possible to design and administer the second stage of the research process (See Appendix for the checklist used in stage 1).

3.6.2 Stage 1

The first phase was to conduct a **workshop** with extension officers in Sekhukhune district. The researcher outlined the purpose and objectives of the research and the participants were allowed to ask further questions for clarifications. The participants were divided into **focus groups** of seven individuals in each group and all the groups used the same checklist to probe the information. Flip charts were used for the

recording of the responses. The **checklist** was subdivided into different themes and at the end of the discussion of each theme a representative from each focus group reported the findings and a video camera was used to record the discussions. The researcher recorded the discussions in shorthand in a notebook.

Through discussions after each theme, data crosschecked by all the role players for validations and similar questions were further asked for clarifications using multiple methods/ triangulation. Triangulation refers to the use of multiple methods of data collection (Denzin, 1978:40; Mouton and Marais, 1994:91). The recorded data was transcribed in full and saved as computer files. The transcriptions in the form of texts constituted the data.

(i) Data analysis

Analysis and interpretation of the texts involved reduction of the information through coding followed by the development of themes, and re-integration of the information into an explanation of different themes. The following steps were followed as part of data reduction and analysis namely: (i) first level coding, (ii) second level coding, (iii) interpretation of themes and (iv) the development of a framework.

Data reduction involved multiple level coding (Henning, 2004: 104; Neuman, 2002: 293 and Fouché & De Vos, 2001: 54), and started by reading the texts several times to become familiar with their contents. First-level coding consisted of the categorisation, labelling of words and sentences with similar meaning. Second-level coding involved the grouping of first-level codes into a smaller number of themes and the seeking for relationships between these themes through the identification of patterns. The next step consisted of the interpretation of the themes and patterns by seeking for explanations in the form of mini-theories developed (Fouché *et al* 2001: 55). The last step involved the integration of the mini-theories in an explanatory framework.

The results of the workshop validated the theories that the Ba-Pedi in Sekhukhune district does have indigenous knowledge with regard to food gathering and production. Out of the results of stage one, an explanatory framework was

developed. The explanatory framework (see Chapter 4) was then used to design a survey questionnaire, which was used in stage two of the research process with the aim of quantifying the research process.

3.6.3 Stage 2

(i) Population

Seaberg (in De Vos, 2001:190) defines a population as the set from which the individuals or units of the study are chosen. A population is the totality of persons, events, case records or other sampling units with which our research problem is concerned. For the purpose of this research three municipalities in Sekhukhune district were selected as the population for this research namely: Makhuduthamaga, Marblehall and Groblersdal. The population was further subdivided through cluster sampling into thirteen villages namely Staykraal B/ Mashupyane, Wonderboom, Tswaing/ Hakdooringdraai, Mphane, Krokodil, Mogalatsane, Phetwane, Mbuzini, Mmmakgatle, Moganyaka, Mogaladi, Legolaneng/ Sepaku and Mogorwane.

(ii) Cluster and stratified random sampling

One of the major constraints common to simple random sampling in a rural setting is the unavailability of lists of elements or units to choose from such as the use of a telephone directory. With limited funds the researcher selected villages within three municipalities of Sekhukhune district as a sample for the purpose of this research. According to Bless & Higson –Smith (2000:91), "… a cluster sampling by selection will lessen the geographic area, reduces travel costs and time and permits careful planning of the data collection process". To ensure external validity thirteen villages scattered across three municipalities were chosen. The geographical map of the area helped the researcher to cluster the villages ensuring that villages are chosen far apart from each other. This was done with the assumption that villages within the same area are fairly similar with regards to their indigenous knowledge and farming practices.

Cluster sampling is used when a sampling frame such as a list of names is not available, but only a map of the relevant geographical area. According to Singleton et al (in De Vos, 2001:197) “cluster sampling draws cases only from these clusters selected for the sample” and in this instance the villages were selected as the sample using clustering methods. Villages were clustered in terms of their historical production patterns (similar characteristics) as outlined through literature review such as those closer to the rivers, which had irrigation schemes and those characterised by dry land farming which are situated far away from the rivers.

Within each village a further random sample of between ten to twenty respondent were selected as research interlocutors using a **stratified random sampling** method. For the purpose of this research, selection of interlocutors depended on three major factors; one was an assumption that the individual selected have knowledge on indigenous food gathering and production activities and secondly the person has indigenous knowledge on or was producing, processing, storing and utilizing indigenous food crops and thirdly, if the person is interested in participating in the research process after being told about the study.

Stratified random sampling is the type of sampling suitable for heterogeneous populations because inclusion of small subgroups percentage wise can be ensured (Van der Walt in De Vos, 2001:197). Stratified sample consists of the universe being divided into a number of strata which are mutually exclusive, and the members of which are homogeneous with regard to some characteristics such as gender i.e. both men and women were selected; age i.e. between the ages twenty to above seventy years, home language i.e. they all speak Northern Sotho; and they have production and or gathering knowledge which is a characteristic of a rural village. Selection of respondents in different stratum occurred randomly resulting in three-hundred and fifty five (355) household members and or smallholder farmers who participated in stage-two of the research process.

(iii) Questionnaire design

Close ended and open- ended questions were designed for stage 2 as data collection methods. The questions were first derived from the literature reviewed and later adjusted and refined in comparison with the results obtained from stage 1 of this research process. The questionnaire was segmented into eight sections namely: (i) Demographic information (i.e. close ended), (ii) Indigenous food gathering, hunting and utilization (i.e. open ended & close ended), (iii) Indigenous farming activities (production, processing, preservation, storage and utilization), (iv) Food storage and preservation, (v) Food processing, (vi) Food utilization and consumption patterns, (vii) Decision making process, (viii) Institutional policy issues (see Appendixes).

(iv) Training of research assistants

Two research assistants were trained to help administer the second stage of the research process. Training lasted for a week. As a starting point of the training, the research assistants were briefed on the content and meaning of the various questions. The research assistants were also trained on the ethics of conducting research and the importance of establishing rapport with the respondents. Although the original questionnaires were written in English the researcher in consultation with Northern Sotho lecturers at UNISA translated the questionnaire into Northern Sotho to facilitate data collection process. This was done to help obtain the right equivalents of the agricultural terms in Northern Sotho.

The questionnaire was discussed with the two research assistants. The importance of these discussion were: (i) To help in correcting ambiguity, (ii) To help the research assistants to understand the questions the same way as the researcher; and (iii) To help the research assistants to collect valid and reliable information intended by the content of the interview schedule.

(v) Pilot Study

Pilot study is a small study conducted prior to a larger piece of research to determine whether the methodology, sampling and research instruments are adequate and appropriate (Bless & Higson-Smith, 2000:155). "A pilot study is valuable, for refining the wording, ordering, layout, filtering and in helping to prune the questionnaire to a manageable length" (Rubin in De Vos, 2001:183). Ten elderly respondents (five men and five women) were selected from Mohlalaotwane (Ga- Rakgwadi) village in Sekhukhune district.

The respondents were selected on the basis of their age, sex, experience and knowledge of indigenous food gathering and production and on the basis of their indigenous farming practices (production, processing, preservation, storage and utilization). The participants were used to test the interview schedule for its content validity. According to Babbie (1994:128) content validity "refers to the degree to which a measure covers the range of meanings included within the concept". The research assistants were observers and were given the opportunity to interview two respondents each during the pilot process. The research instruments used for the pilot stage were modified and then used in data collection.

(vi) Implementation process

Data collection using a structured interview schedule (open ended and close ended questions) started in August 2004 and ended in June 2005. The researcher and the research assistants interviewed the participants and filled the questionnaires on their behalf. This was done to ensure that all the questions were uniformly asked, interpreted and answered, and to overcome the problems where in some villages the participants could not read and write but have knowledge of indigenous food gathering and production systems. During this period 355 interlocutors were contacted, randomly selected and interviewed. Completed interview schedules were checked at the end of each day to ensure proper data recording. The researcher used a camera to capture some of the indigenous foods, tools and utilization patterns

of some of the respondents who were willing to allow the research team to observe them at household level (see Appendix figures).

(vii) Data analysis (stage 2)

Data collected from a total of 355 randomly selected interlocutors were captured by direct data-typing of the self-coded questions and transferred to coded responses into the data-set using Statistical Package for Social Science (SPSS) Data Entry II TM computer programme. After the data entry, descriptive statistics of selected variables were used. To analyse the data frequency distributions and cross tabulations were used to facilitate displaying the data. Data displaying involved the use of tables, frequencies, percentages and graphs such as pie charts and histograms.

3.7 Summary

This chapter outlined the methodology of the study. Limpopo province and Sekhukhune district in particular were put in perspective. Various research techniques were employed in data collection and the methods of data analysis were discussed.

CHAPTER 4

THE RESULTS OF PHASE 1 & PHASE 2:

INDIGENOUS FOOD GATHERING AND PRODUCTION AS PERCEIVED BY EXTENSION WORKERS AND SELECTED FARMERS IN SEKHUKHUNE DISTRICT

4.1 Introduction

Sekhukhune district consist of the Ba-Pedi population group although there are sporadic generations of other cultural groups such as the Ndebeles, Vendas and Tsongas. This chapter discusses two phases of the research report namely phase 1 with the results of data collected from the extension workers (42 in number) and the results of the data collected from the farmers (355 in number) as phase two of the research report.

4.2 The results of phase1: a workshop conducted in Sekhukhune district with extension workers

Phase one of the research, is a report of **a workshop** held at Tompi Seleka College of agriculture on the 30th June 2004. The participants were 42 extension workers of Sekhukhune district. Qualitative data collection methods were used such as focus groups and writing the responses on flip charts and presenting the data. The role of the researcher was to probe the discussions while one of the research assistants recorded the data in a notebook. A video camera was used to record all the presentations and the proceedings of the day. After the workshop the data was clustered and categorized into three themes namely:

(i) indigenous food gathering; (ii) indigenous food production, processing, preservation, storage, utilization and (iii) institutional and policy issues.

4.2.1 Indigenous food gathering

Some of the communities in Sekhukhune district are capable of gathering indigenous vegetables, roots and fruits. Table 1 is a summary of vegetables, Table 2 a summary of roots and Table 3 is a summary of fruits, which are commonly found in Sekhukhune district.

Table 4.1: Indigenous wild vegetables as outlined by extension workers

Northern Sotho name	**English**	**Scientific**
Leroto	Cat `s whiskers, African spider flower, Cleome	Gynadropsis pentaphilla D.C.
Letlhanye	Long legs/ Lang Been	Vernonia fastigiata O&H
Monyaku	Wild cucumber	Cucumis, Curcubita sp
Letloane	*	*
Theepe	Pigweed	Amaranthus thunbergii Moq
Monyane	Black jack	Bidens bipinnata L.

* No English name

According to the extension workers, communities in Sekhukhune district can gather six types of indigenous vegetables, which are commonly found after the first rain falls. Women and girls are the ones who gather indigenous vegetables in the veld. The vegetables are cooked while fresh and served with porridge as a relish. In areas where the vegetables are plenty women will gather them and process them by cooking them, shaping them into small balls and then drying them for future use i.e. consumption. This is known as mokhuša. Vegetables such as “monyaku” and “letloane” are dried fresh while “letlhanye” and “leroto” are cooked before drying because of their bitter taste. The only indigenous vegetable, which can be sold is “leroto” being fresh or as “mokhuša” (cooked dried vegetable). These results indicated that indigenous vegetables are known and are still used by the community to ensure household food security.

Table 4.2 Indigenous roots as outlined by extension workers

Roots in Northern Sotho	**English**
Kganyane	*
Sero	*
Lešoga	*
Sekanama	African potato
Magaba	*

* No English name

Indigenous roots (table 4.2) are collected and consumed by boys and girls as a snack. Sekanama (African potato) is the only root, which is mostly harvested by traditional healers for medicinal use. Indigenous roots are labour intensive therefore they are less collected when one compares them with the collection of fruits and vegetables.

Table 4.3 Indigenous fruit trees as outlined by extension workers

Northern Sotho names	**English names**	**Scientific names**
Marula	Marula	Sclerocarya caffa Sond
Difoiye	Prickly pear	Opuntia megacantha Salm Dyck
Mabupudu	*	*
Mahlatswa	Wild plum	Chrysophyllum magaliesmonanum Sond
Mabilo	Wild medlar	Vangueria infausta Burch
Dikgoto	*	*
Dithetlwa	*	*
Dikonaona	*	*
Ditšhidi	Sour plum	Ximenia caffra Sond
Magaba	*	*

* No English name

Women, girls and boys are the ones who collect indigenous fruits. Marula fruits are mostly collected to make marula beer. Marula nuts are used as a snack. Other fruits are consumed whole when in season.

Some communities in Sekhukhune district can gather small insects such as “dintlhwa”, “mabitsi”, “ditšie” (locusts), while mopani worms are sold in local shops. Insects are cooked and consumed with porridge as a relish. In areas where insects are plenty, household members will collect them, fry them and dry them for later use.

Wild animals are currently scarce although there is a sporadic consumption of wild animals such as “mmutla” (Cape Hare), “letlabo” (Mountain Reedbuck), “pela” (Rock Daisie), “sehlong” (Hedgehog) and “makwelele” (wild large rats). Animals such as bucks (phala/ impala, tholo/ Kudu and phuti/Grey Duiker) are scarce although the respondents indicated that if found they are killed, biltongs are made for consumption. Communities staying closer to the river and dams such as Phetwane village, consume different types of fish such as “paboro”, “motoro fish” and “tšegetšege”. Consumption of fish is not regarded as indigenous to the Ba-Pedi communities.

4.2.2 Indigenous food production, processing, preservation, storage and utilization

(a) Indigenous food production

Crop production is reported as an indigenous way of facilitating the livelihood and food security for Sekhukhune villagers. Extension workers indicated that the communities are aware of the seasonal calendar of when to plough, weed and harvest their crops. Most of the communities use indigenous methods to thresh and process their crops. Table 4.4 is a summary of indigenous crops, which are produced by small- holder farmers in Sekhukhune district.

Table 4.4 Indigenous crops

Food crops in Northern Sotho	**Food crop in English**	**Scientific names**
Mabele thoro	Sorghum	Andropogon sorghum Brot
Leotša	Millet	Pennisetum spicatum Koern & vars.
Lehea	Maize	Zea mays L.
Dinawa	Cow peas	Vigna sinensis Endb.
Phootla/ Ditloo marapo	Bambarra ground nuts	Voandzeia subterraanea
Dihlodi	Mung beans	Phaseolus aureus L.
Magapu	Water melons	Citrullus vulgaris Schrad vars.
Mafodi	Pumpkins	Cucurbita pepo L.
Maraka	Gourds	Lagenariavulgaris
Digo	Calabashes	*
Ntsho/ Nyoba	Sweet reeds	Sorghum vulgare Pers.
Diponkisana	Small white beans	*
Lerotse	Citron	Citrullus vulgaris sp.

Extension workers reported that there are thirteen indigenous crops, which small-holder farmers produce in their area. However, in areas where farmers stay closer to the river and have access to irrigation systems they produce wheat in winter and maize in summer. They also practice mono cropping. Extension workers staying in the dry land reported that the communities plant multiple indigenous crops. It was because of these two comparisons that the researcher realized a need to segment the research area into two sections i.e. the area where dry land farming is practiced, and the area closer to the dams and rivers where irrigation is practiced.

(b) Indigenous food processing

In areas where wheat is produced, advanced machines are hired to process the wheat. Most of the communities process their crops manually with their own hands. Threshing tools commonly used are “morogo” (threshing stick) and “pato”, which are used to thresh millet, sorghum, mung beans, cow- peas and bambarra ground nuts. Communities normally prepare threshing platforms in their fields or at home in preparation for the threshing process. Some communities use pestle and mortar to process maize into samp (broken dried maize kernels) or mealie rice (the smallest broken end product of maize kernels, more or less to be compared in size to rice).

(c) Preservation

The extension workers reported that aloe ash is added to harvested crops such as sorghum, mung beans, millet and cowpeas to prevent infestation by weevils. Aloe ash is added to the crop before storage. Indigenous vegetables such as pumpkin leaves are shade dried and stored in buckets, while cowpeas leaves are cooked, mashed and shaped into small flat pellets like structures and dried on a corrugated iron sheet. Dried cowpeas leaves are known as “mokhuša”.

(d) Storage and utilization

Produced crops such as beans, maize, sorghum or millet are stored in bags and transported to the mill in town. Few crops are stored at household level for household consumption. Crops produced are utilized at household level while crops like sorghum can be used for battering i.e. sweet potatoes or cabbages.

Crops produced are used to make different types of dishes i.e. vegetables are used as relish while cowpeas can make a relish known as “setlopša”. A combination of cowpeas, bambarra nuts and sorghum can make a dish called “tšhima”. Dried maize corn can be boiled and make a dish called “lekokoro” while when crushed can make samp. Sorghum and millet can be used to make porridge or indigenous beer. Citron is used to make a dish called “kgodu”. According to the extension workers, farmers

in Sekhukhune are still keen to produce indigenous crops. In areas where production is high, farmers sell their crops to the mills and use the money earned to acquire other household necessities.

4.2.3 Institutional and policy issues as outlined by extension workers

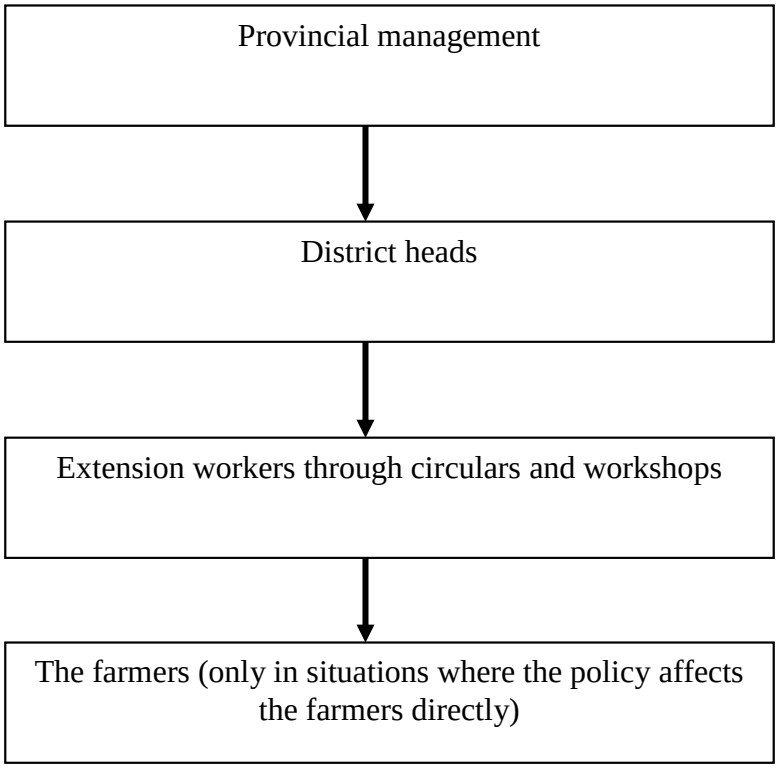
The extension workers were asked to list important policy documents from their department of Agriculture. They listed the following:

- Natural resource management policy
- Human resource development policy
- Land Reform and Distribution (LRAD) policy
- Live stock improvement and animal health policy
- Farmer support services policy.

Although they could list policies, when they were asked to indicate the implication of the said policy to agricultural extension their responses were minimal and when asked to give researchers a copy of each of the listed policies, none of them could produce or promise to give the researchers a copy of any policy document. At the time of the research, extension workers policy was not available. They were using the old policy frameworks. The following policy documents were also unknown to the extension workers:

- Indigenous knowledge systems` policy
- Bio-diversity act
- Integrated Food security policy

When asked on how the policies are distributed they indicated the following structure:



Although extension workers are aware of the importance of knowing the policies they indicated that the red tape between the provincial levels to the ground (municipal level) is too huge to render the delivery of advanced policy documents. They also indicated that they do not have access to research documentation, which relate to their work.

The above research report (Phase1) became an input into phase 2 of this research report. It was used as a guideline when formulating a questionnaire to interview the farmers face to face. Extension workers` information helped the researcher to formulate a theoretical framework which was used to organise and design phase 2 of this research report.

4.3 THE RESULTS OF PHASE 2:

SOCIO-DEMOGRAPHIC DATA, INDIGENOUS FOOD GATHERING AND PRODUCTION

Phase 2 is the results of data collected from thirteen villages in Sekhukhune district (from a total of 355 farmers). For the purpose of this research, the researcher used the concept “interlocutors” referring to “respondents”. The Oxford dictionary (1982) define interlocutors as “one who takes part in a dialogue”. The communities in thirteen villages were observed, interviewed and they took part in the whole research process. In themes where questionnaires were used the researcher interviewed them face- to-face and filled the questionnaire on their behalf. This was done to cover even those farmers who cannot read and write.

4.3.1 Socio demographic characteristics of the farmers and their implications to agricultural extension in Sekhukhune district

(a) Ethnicity and language

Research conducted by Tieku (2000:55) indicated that the majority of the population in Sekhukhune district are of Sotho decent. They are called Ba-Pedi and they speak Northern Sotho. All the 355 farmers interviewed speak Northern Sotho. Therefore the research was conducted in Northern Sotho and transcribed to English.

(b) Research area and total interlocutors per village

The research was conducted in thirteen villages selected in consultation with local extension workers. In each village, the local extension worker formed part of the discussions. The reasons for involving local extension workers were to ensure that the people who are interviewed are farmers and that the results of the research should be communicated back to the communities through respective extension workers. Figure 4.1 gives a summary of the villages, frequencies, percentages and a cumulative figure of 355 was achieved as a total sample.

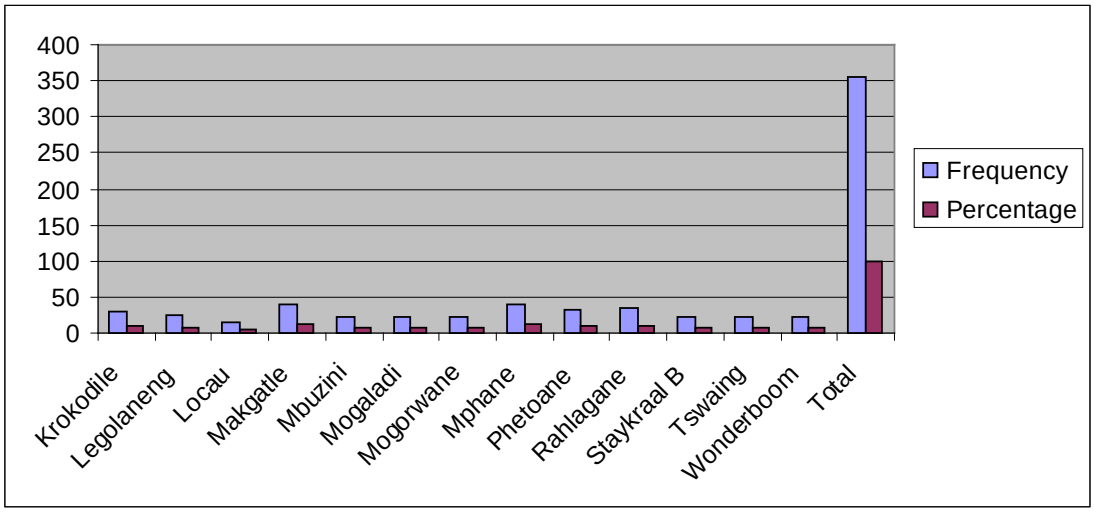


Figure 4.1: Total number of villages, frequencies and percentages of the interlocutors

In each village, the farmers who participated in the research process were fewer than the anticipated i.e. less than forty farmers per village while the researcher `s expectations were to interview more than fifty farmers per village. The implication was that villagers in most of the villages were not keen to be part of the research. In villages closer to the rivers such as Phetwane, Krokodille, Mphane, Wonderboom, Tswaing and Staykraal B the interlocutors received the researcher with anger. They were angry because earlier researchers and officials from the government promised them to repair their irrigation schemes, which were not operating since the floods, which took place in 1998. Although the purpose of this research was not to investigate the problems of the farmers, but in each village the farmers bombarded the researcher with technical problems with the hope that the researcher will help them to solve these problems. The lower attendance (i.e. less than 41 in each village) gave the researcher an added advantage of working with manageable groups. Focus groups were formulated in each village to discuss general qualitative questions. Focus group interviews can be defined as a purposive discussion of a specific topic or related topics taking place between eight to ten individuals with a similar background or common interest (Schurink, Schurink & Poggenpoel, 1998:314).

(c) Sex and age group of interlocutors

Out of a total number of 355 interlocutors, 43% were males while 57% were females. The results indicate that in rural areas of Sekhukhune district majority of the farmers are females. The results also indicate that innovations in agriculture should be directed to both males and females while giving more attention to females as they comprise majority of farmers in the research area. Research conducted by Lemke (2001:9) indicate that "… black women in pre-capitalist farming society of Southern Africa worked the land and were responsible for child care and domestic work while men migrated to the urban areas". It is against this background that extension innovations should be directed to women but emphasis should be that the women should share their farming experiences with their children through socialization process. Figure 4.2 is the distribution of interlocutors according to sex, which indicate that there were more female interlocutors than male.

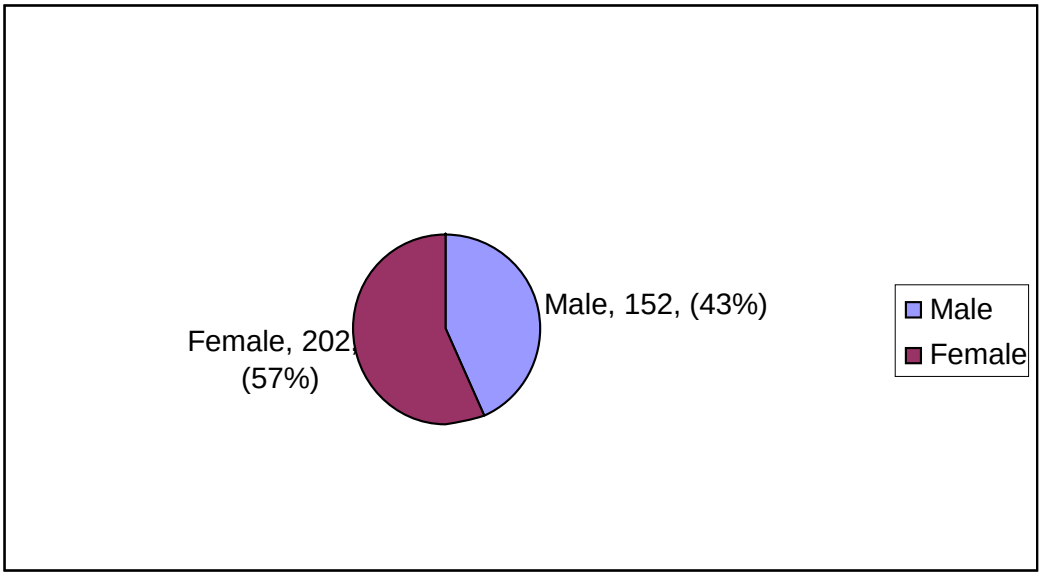


Figure 4.2: Distribution of interlocutors according to sex

Tabulation of age frequencies also indicated that a larger percentage of the farmers are the elderly while a lower percentage falls between the ages 20 to 40 years. This is observed in figure 4.3

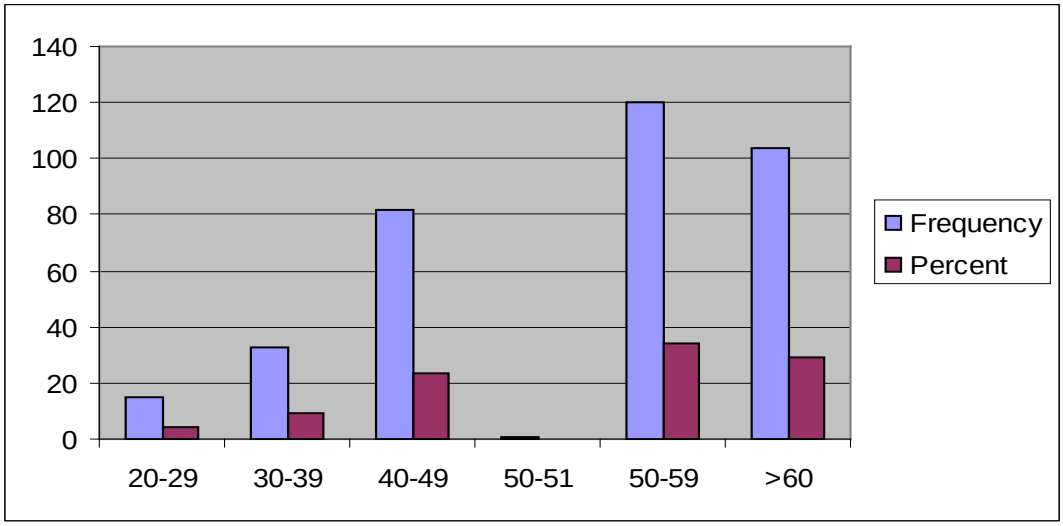


Figure 4.3: Age distribution of the interlocutors

Research conducted by Tieku (2000:56) also arrived at the same results that 67% of the farmers in Sekhukhune are the elderly. This has implications for agriculture production and agricultural extension in particular. It implies that the current extension workers have a major challenge of marketing their product (agricultural extension) to the youth. The whole process will need a paradigm shift where by innovations in agriculture need to be directed to the youth. Tieku (2000:56) recommended that agriculture should be taught at schools in order to attract the youth.

(d) Education

The educational level of the interlocutors in the study area is indicated in Figure 4.4. In the study area, 45% of the interlocutors had no formal education, 33% had only primary education while 13% had a secondary education. Eight percent (8%) of the interlocutors had a high school grade while 1% had diplomas and none had a

degree. Although the research area does have schools, the current school programme is only geared towards small children.

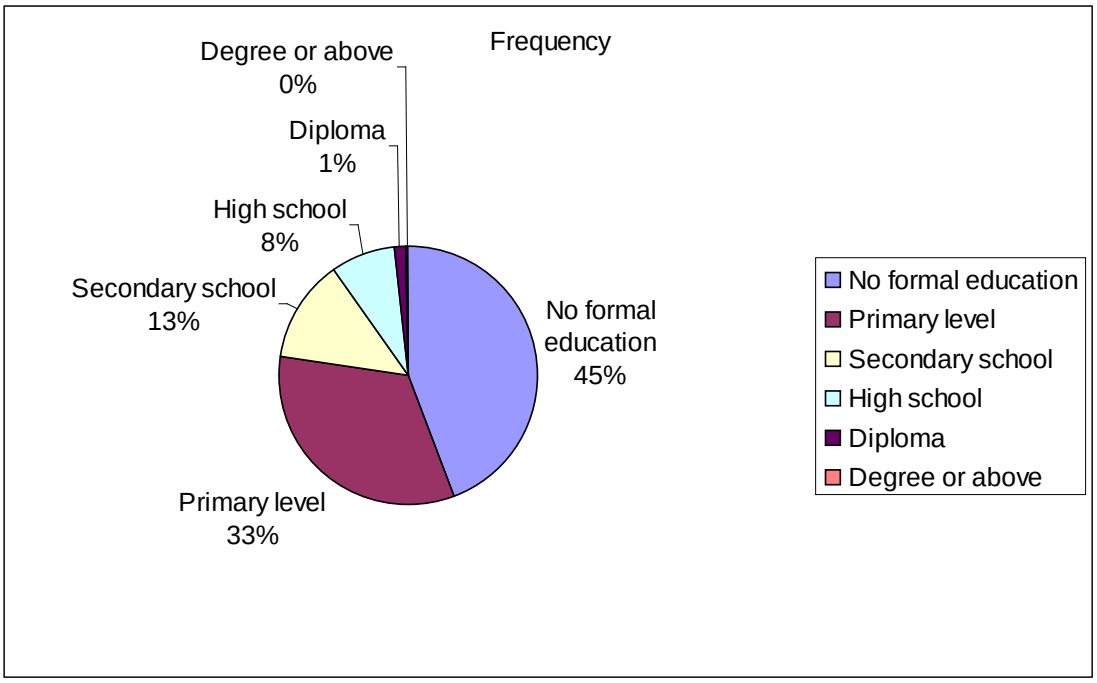


Figure 4.4: The level of formal education of the interlocutors

One of the questions, which the researcher asked the interlocutors, was whether their educational levels do influence their farming activities. Those who went to school (56%) indicated that they were never taught farming during their schooling years and that they learned farming skills from their parents and grand parents. In villages which had irrigation schemes prior to 1998, the farmers (47%) indicated that extension workers did contribute to their farming activities by providing them with training and implements for farming such as tractors (their irrigation systems were not operating during the time of this research). The affected villages were Phetwane, Mphane, Krokodille, Wonderboom, Staykraal B and Tswaing. The results indicate a need to incorporate agricultural activities in the main stream of education while giving more support to the extension service, which if supported could provide more training in agriculture to augment the current education system and to instil agricultural production to the youth.

(e) Employment status and farming experience of interlocutors

Employment opportunities in rural areas are very limited or non existent. The unemployment rate of Limpopo province is 46% (Lemke 2001) ranging higher in Sekhukhune district where this research was conducted. Personal interviews with the interlocutors indicated that 57% of them were unemployed while 28% are pensioners. The result has an implication for agriculture because agriculture and subsistence farming in particular is not viewed as an employment opportunity but rather as an add-on activity because it does not provide cash income to the interlocutors. Figure 4.5 outline the employment status of the interlocutors.

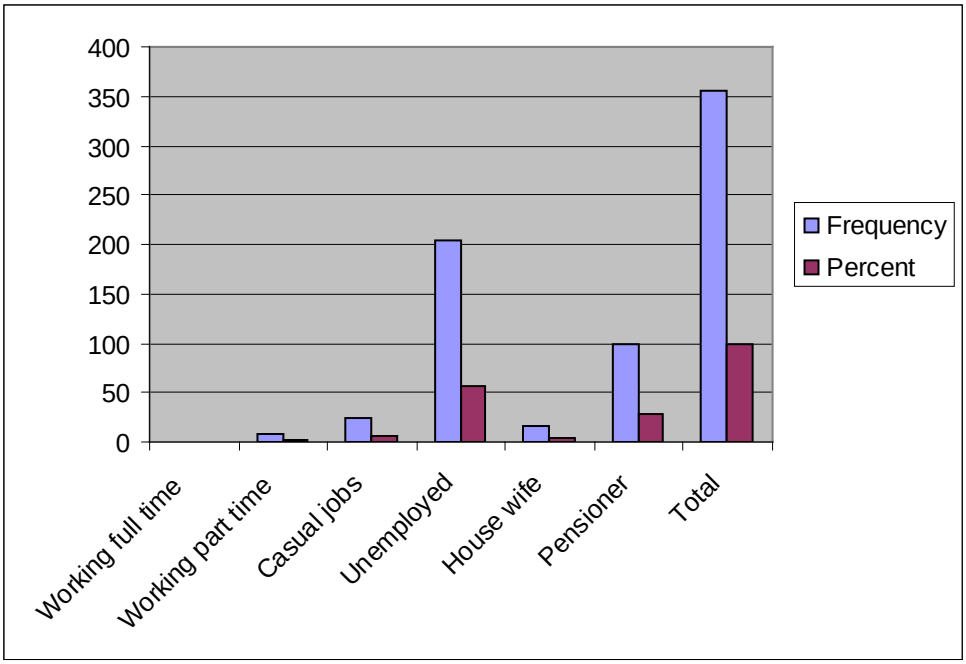


Figure 4.5: Employment status of the interlocutors

(f) The farming activities of the interlocutors

Figure 4.6 represent the farming activities of the interlocutors. Out of a total of 355 interlocutors, 1% was a full-time farmer; 3% were part-time farmers; 11% were part-time farmers who also depend on remittance from migrant workers who form part of their family. Seventy-seven percent (77%) of the interlocutors indicated that they use

different coping strategies including seasonal farming for their survival. Five percent (5%) of the interlocutors indicated that they were part-time farmers but incorporating farming with indigenous food gathering, while the last 3% incorporate indigenous food gathering with remittances send home by the migrant workers.

On average their average duration of stay in the village was 36 years. This percentile calculation of years (36) gave the researcher an indication that the interlocutors have 36 years of experience in agricultural production and their farming environment. This assumption is supported by research conducted by Tieku (2000:63) "… the study revealed that all farmers are well experienced and can therefore have adequate information about the place. Their knowledge of the place is therefore of vital importance for research and technology development".

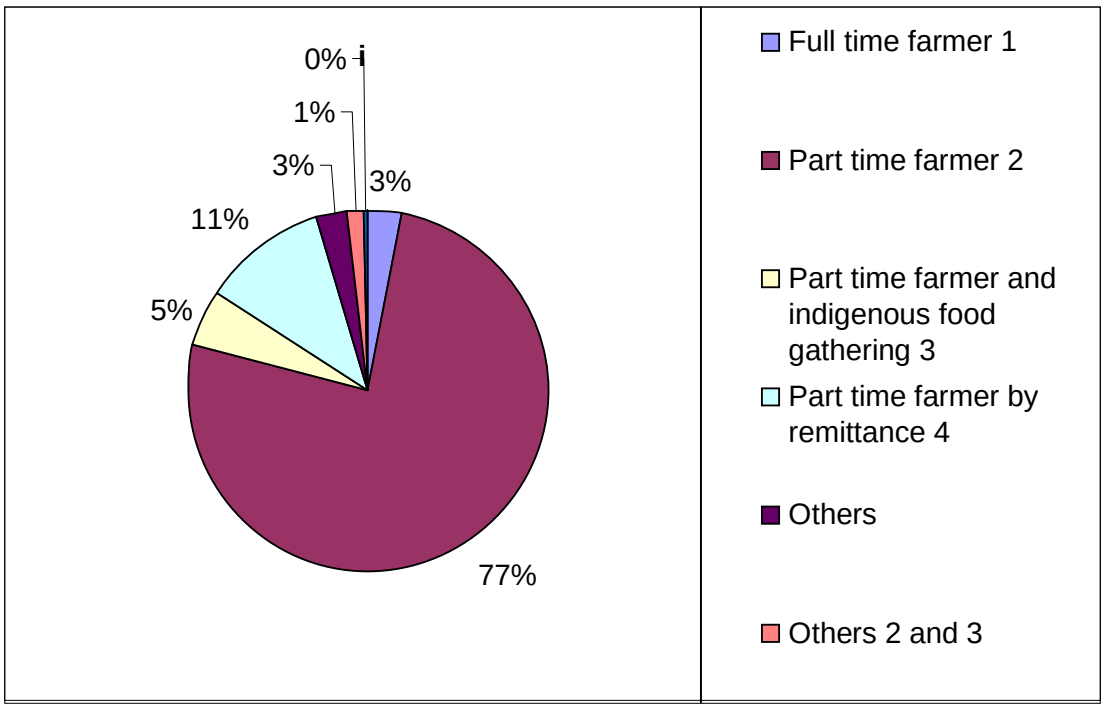


Figure 4.6: Faming/ Living activities of the interlocutors

(g) The interlocutors' frequencies of visiting their fields

Figure 4.7 is a summary of the interlocutor's frequency of visiting their fields. When asked how often they visit their fields, 98% of the interlocutors reported visiting their fields seasonally which indicate that farmers in Sekhukhune district are seasonal farmers. The reason for participating in seasonal farming was lack of water for irrigation in villages such as Mogaladi, Legolaneng, Mbuzini, Locau, Ga- Rahlagane and Mmakgatle where they practice dry land farming. While in villages closer to the river such as Krokodille, Mogorwane, Mphane, Phetwane, Staykraal B, Tswaing and Wonderboom, their problems were as follows:

- The 1998 floods eroded their land, which need technical implements to repair while the farmers indicated that they lack both implements and money to repair the damage.
- Wonderboom village interlocutors indicated that the irrigation pipes were stolen and the farmers do not have money to buy new ones
- Generators to pump the water from the river were stolen
- Electric pumps to pump the water were broken, neither the extension worker nor the communities know how to repair them
- The fences which demarcated the fields and the grazing land were stolen because communities no longer have the services of rangers to monitor their fences
- Support system given by the extension workers during the apartheid era was since 1994 to date withdrawn i.e. tractors were taken away from their district, rendering the extension system ineffective.

These reasons and many others, created a seasonal culture of production even in areas, which during the apartheid era practiced fulltime farming. The researcher observed the white commercial farmers in the same region producing crops year round. This comparison created an assumption that year round production is only possible to the minority while majority are trapped in seasonal farming or no farming at all. The rate of seasonal farming is currently 98% as show in figure 4.7

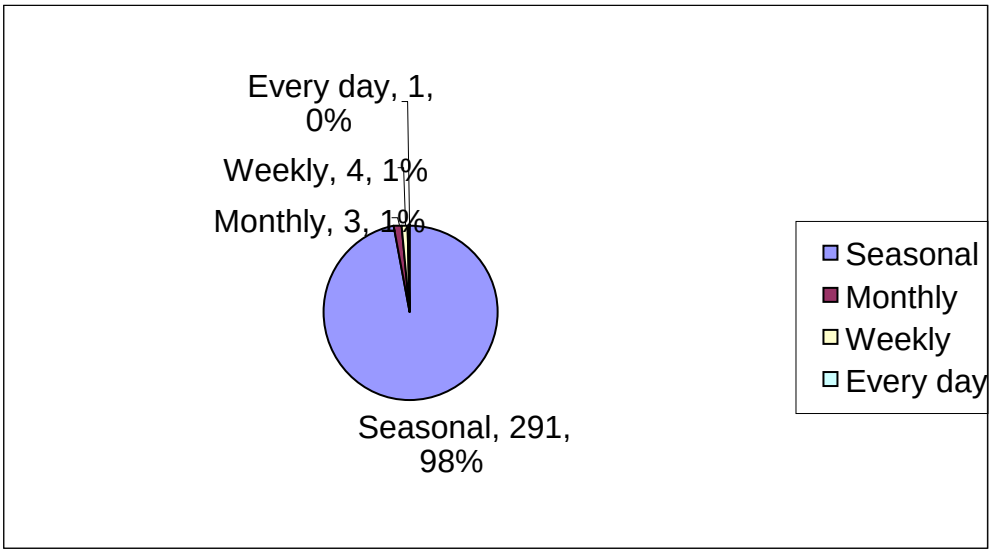


Figure 4.7: The nature of seasonal farming

(h) Socio-economic factors

The interlocutors were asked to unpack their socio-economic factors such as the total number of household members and their monthly incomes/remittances/pension and any other source of income. On average, the total number per household was six (6) members while income and expenditure per month was between R200.00 and R700.00, which is an amount below poverty line. What does this assumption hold for agricultural extension? It indicates that if extension can be given support it can contribute to the livelihood of the villagers and it can add and contribute towards their household food security while creating seasonal or full-time employment opportunities for the villagers. Lemke (2001:23) puts the situation as follows "… subsistence farming has further more largely been destroyed by underdevelopment of black rural areas, (i.e. lack of support by government) depriving people of producing their own food (Coovadia, 1993) and thus contributing to household food insecurity". Figure 4.8 is a summary of the remittances per month for each family/household as outlined by the interlocutors.

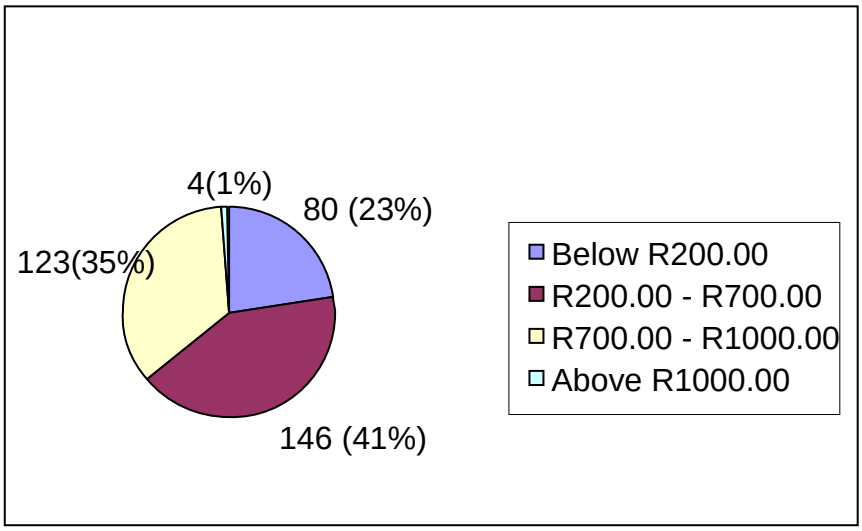


Figure 4.8: Remittances of the interlocutors

4.3.2 Hunting, gathering, processing and utilization of indigenous wild foods

Data on indigenous food hunting and gathering was collected through qualitative methods. Qualitative tools such as focus group discussion were used. Data gathered was recorded on flip charts, which were later transcribed into narratives and categorized into tables. A video camera was used and later transcribed into themes to help the researcher to write this report. In each of the thirteen villages visited the researcher and two research assistants used the same probe questionnaire to probe the process until saturation. This process forced the researchers to spend two days in each village.

(a) Indigenous wild animals

When interlocutors were asked as to whether their parents did hunt wild animals, the elderly interlocutors indicated that their grand parents hunted wild animals and used them for subsistence. The current generation do not hunt wild animals because they are not available in their communities. Frequency and percentages for hunting animals indicated that 37% of the interlocutors were herd boys who were sometimes

seen hunting small animals while 63% of the interlocutors indicated that wild animals are no longer available in their vicinity. When interlocutors were asked as to whether they are legally allowed to hunt wild animals, 97% indicated that they are not allowed to hunt wild animals and birds. Communities indicated that prior to 1994 they had services of rangers who ensured that those who poach wild animals are prosecuted. Table 4.5 is a summary of some of the wild animals, which are hunted by herd boys.

Table 4.5: Indigenous wild animals hunted in Sekhukhune by herd boys

Indigenous wild animal (Northern Sotho Name)	**Indigenous wild animals in (English Name)**
Tola	Spring Hare
Hlolo	Red Hare
Kolobe ya naga	Warthog
Khudu	Small land Tortoise
Noko	Porcupine
Serolo	Cape bush buck
Lebudi	Cane Rat
Pela	Rock Dassies
Thakadu	African Antbear
Kome	Klipspringer
Sehlora	Yellow-footed Squirrel
Kgano	Slender Mungoose
Mmutla	Cape Hare
Makwelele/ maparagane	Wild large rats
Sehlong	Hedgehog
Legotlo	Black Rat
Letlabo	Mountain Reedbuck
Tšhipa	Large spotted Genet
Moswe	Suricate

When interlocutors were asked as to whether there is any policy which governs the hunting of wild animals, 28% indicated that there is a policy while nearly 72% indicated that there is no policy. These percentages indicate that the communities are not sure of the current policies which govern hunting and fishing. However, the implication for extension is to ensure that available policies are communicated to the communities. Large wild animals are becoming extinct because of lack of policies to control and to protect them against poachers.

(b) Indigenous wild birds

Herd boys normally hunt different kinds of birds, which are consumed as relish. The interlocutors were asked to rank order indigenous wild birds in terms of their preferences. The following list was the results:

- 1. Crowned guinea- fowl
- 2. Redwing partridge
- 3. Cape rock pigeon
- 4. Ground woodpecker
- 5. Red-headed quelea
- 6. Spotted backed weaver

The six birds were chosen because of their characteristics such as taste, body structure and some of them are easy to capture, therefore, they are hunted more frequently. Table 4.9 outlines different types of birds commonly used by herd boys as relish.

Table 4.6: Types of birds normally hunted by herd boys in Sekhukhune district

Northern Sotho name	**English name**
Kgaka	Crowned guinea- fowl
Kgogoropo	Bradfield's hornbill
Kgwale	Redwing partridge
Kurutle	*
Kukuu	*
Kgogoropo	*
Kgwajana	*
Hubela	*
Leakabosane	White stork
Leakgola	Black stork
Leebarope	Cape rock pigeon
Legodi	Burchell`s glossy starling
Lehuhu	Swainson`s francolin
Lephepane	Laughing dove
Letsiakaka	Red faced coli
Leubaubane	Double banded sand-grouse
Leparegwane	*
Leisiisi	*
Mmakwele	Red –eyed bulbul
Mathekaneng	Cape wagtail
Mmankutukutu	Secretary bird
Mmanotswaneng	Malachite sunbird
Malapane	*
Mogwale	Grey heron
Mokgothane	Crowned hornbill
Mokgorwane	Namaqua dove

Mokowe	Grey Laurie
Mokurutshepe	African hoopoe
Monope	Paradise widow bird
Mororwane	White-quelled Koran
Phaphadikota	Ground woodpecker
Ponyane	Red-headed quelea
Segodi	Neumann's kestrel
Segwaragwara	Namaqua sand grouse
Sekwiri	African quail
Sellamotlhaka	Spurwing goose
Seroromahlwana	Crowned plover
Senwamorula	*
Thaga	Spotted –backed weaver
Thapyane	Long-legged Koran
Thomoratsokwe	Fiscal shrike
Sebota	*

* No English name

(c) Fresh water fish

The communities staying closer to the dams and rivers indicated that fishing is the activity carried out by herd boys, and fish is currently used as a relish. The researcher observed boys fishing i.e. in Phetwane village, which lie below Flack Boshielo dam. In terms of fish consumption by the villagers 55% reported that they don't consume fish while 45% indicated that they do consume fish. This results were compared to Quin (1959) who concluded that Ba-Pedi do not consume fish as they associate it with snakes. The interlocutors indicated a minimal increase in the consumption of fresh water fish within the communities. The interlocutors listed the names of the most commonly consumed fishes such as the ones in table 4.7.

Table 4.7 Fish population found in large rivers and dams

Name of the fish in Northern Sotho	**Name of fish in English**
Paboro	Cat fish
Tšegetšege	Minnow
Kapa	Piranha
Kgoka	*
Kerepole	Desert pup fish
Mantome	*
Yellow fish	Yellow fish
Grey fish	Grey fish
Mosega o hloga	*
Mamotalane	*
Silver fish	Trout
Mohlalatsoku	*
Curry fish	*
Paleng	Common eel
Fish	Rouch

* No English name

The interlocutors indicated that majority of the communities consume tinned fish. One of the objectives of this research was to compare data as recorded by previous researchers and the livelihood of the current communities. The current communities indicated a slight increase in the consumption of fish. The results of this research indicate that acculturation and modernization created a shift in indigenous values to a new culture. The implication of this to the extension workers might be to start fishery projects i.e. fish ponds in areas where fresh water is available.

(d) Indigenous wild insects

Literature reviewed indicated that communities in Sekhukhune gather insects and consume them (Quin 1959). Data analysis indicated that 40% accepted that they sometimes gather insects while 60% indicated that they no longer gather insects. Reasons for not gathering insects were that other community members might regard them as backward while others indicated that it is time consuming to gather them. Traditionally, insects were gathered by boys and girls, but due to modernization children are no longer keen to collect them. The only product from insects, which the herd boys are fond of collecting, is honey collected from beehives in the veld and mountains. This has implications for extension because beekeeping can be turned into income generating projects within the rural setting thus creating a market and employment opportunities. Some of the most common insects, which were used as food or relish, are summarized in Table 4.8.

Table 4.8: Insects used as food

Insect in Northern Sotho name	**Scientific name**
Khagaripane	Polycleis plumbeus Guer.
Lebitsi kgomo	Sternocera orissa Buq.
Dintlhwa makhura	Cerebara vidua Sm (female)
Dintlhwa bogwale	Cerebara vidua Sm (male)
Legakgala	Gynanisa maia Klug.
Mmakonokono	Gonometa postica Walk
Naatla	Herse convolvuli L.
Ngwana Mamahlwehlwana	Bombeycomorpha pallida Dist.
Noto	Cerina forda Westw.
Noto leetsana	Conimbrasia belina Westw.
Kodi	Zonecerous elegans Thb.
Segongwane	Locustana pardalina Walk.

Maphata-kakalana	Nomadacris septemfasciata Serville
Makganthwane	*
Senkoko	*
Mammati	*
Tšie kgwana	*
Dikokobele	*
Letlorontlope	*
Tšie mamorathane	*
Nthagalele	*
Mamapo a dinosi	Honey from bees

* No English name

(e) Gathering, processing, preservation and utilization of indigenous wild vegetables

When indigenous wild vegetables were subjected to frequency and percentage table, the results indicated a 100% consumption of indigenous vegetables especially when they are in season. Indigenous vegetables are gathered and collected from communal areas around settlements, residential plots, with many found in arable or abandoned lands, along road sides and in deserted animal kraals. Indigenous vegetables were processed by washing, cooking them and when cooked they are mashed. The mashed dough of vegetables is then shaped into small pellets and dried on top of corrugated iron roofing sheets. When dried the pellets are known as “mokhuša”. The second method of processing some of the vegetables was to collect, wash and drying them under a shade until they are very dry. Dried vegetables are stored in airtight buckets or in bags. Vegetable such as “leroto” can be gathered and sold while fresh or can also be cooked, dried and sold. All vegetables are served as relish with porridge. Indigenous wild vegetables are ranked higher. Table 4.9 is a summary of indigenous wild vegetables, which are found in Sekhukhune district.

Table 4.9: Indigenous wild vegetables

Wild vegetables in Northern Sotho	**Scientific names of Wild vegetables**
Serepelele	Amaranthus spinosus L.
Lefotosane	Pentarrhinum insipidum E. Mey
Mothuhu	Pergularia extensa N.E. Br.
Leroto	Gunandropsis pentaphylla D.C.
Sekalerothane	Cleome monophylla L.
Serua	Chenopodium murale L.
Theepe	Amaranthus thunbergii Moq
Monyane	Bidens bipinnata L.
Lesese	Sonchus oleraceus L.
Lehlanye	Vernonia fastigiata O& H.
Maswi-a- pudi	Ipomoea lugardi N.E. Br.
Monyaku	Cucumis africanus L.f.
Thagaraga	Cucumis melo L.
Mokiti	Citrullus vulgaris var. Lanatus Baily
Kaukau	Coccinia rehmannii Cogn.
Mosegasegane	Momordica balsaaaamina L.
Mošwe	Salanum nigrum L.
Tshehlo	Tribulus terrestris L.
Monota	*
Letloane	*
Moo	*
Mošidila	*
Thelele	*
Mosegamono	*
Lethotho	*
Botankane	*

Lefse	*
Mokolonyane	*
Lekgakga	*
Motankane	*
Mpotsana	*
Phara	*
Mogopse	*
Kgongwanaswana	*
Motšhakgatšhakga	*
Mankoko	*
Sehlampotsane	*
Theepe kgolo/ ya dipere	*
Mowo	*
Mothukgule	*

* No English name

When comparing indigenous vegetables listed by extension workers (in table 4.1 page 52, Phase 1) and that of the current communities (table 4.9) it is evident that communities have more knowledge of indigenous vegetables than extension workers. This knowledge gap has implications for agricultural extension in the sense that extension workers should first learn from the communities before they could promote indigenous vegetables. Research conducted by Quin (1959:61-80) described twenty different kinds of indigenous vegetables while the current research results indicates that there are forty types of indigenous vegetables. This discrepancy might be brought by forced removals which took place in Sekhukhune where different nationalities were brought together to settle in the Ba-Pedi villages creating a wider vegetable choices due to accumulated cultural knowledge caused by acculturation. Interlocutors indicated a high consumption of indigenous vegetables during summer months especially after the first rain falls.

The availability of indigenous wild vegetables depended on sustainable climatic conditions e.g. rainfall- hence the seasonal availability of the plants. In cases where households intend drying the leafy vegetables, time is needed to pick large quantities and sunny dry weather is important for rapid drying of the vegetables. Time is also needed for picking, cleaning, chopping and drying the vegetables. Women did most of the gathering and drying of indigenous vegetables. Picking also require planning e.g. one may not pick the vegetables immediately after a heavy rain because the vegetables will be full of sand. The technique for picking, processing and drying also need indigenous know how.

(f) Gathering, processing, preservation and utilization of indigenous wild fruits

Research conducted by Quin (1959) and Coetzee (1982) indicated that Ba-Pedi consumed nine types of wild fruits, which were regarded as snacks while the results of this study indicated that communities can gather seventy species of wild fruits in Sekhukhune district. The discrepancies in both research results were brought by acculturation and forced removals which brought other nationalities to settle with Ba-Pedi introducing them to new species resulting in the identification of seventy species.

Indigenous wild fruits play an important role as they are regarded as snacks. Marula fruit is processed and fermented to make marula beer, which can be sold locally as a beverage. The wood of marula tree is used to manufacture household utensils such as mortar, porridge bowl, milk pail, meat dish, spoons, spatulas and porridge stirring sticks, while marula kernel (koko) is cracked and the inside embryos (mooko) is consumed as a snack. Some households use “mooko”, as a condiment when preparing indigenous vegetables.

Mabilo fruit can be mashed and fresh milk added to it to make indigenous yoghurt. Matšhidi fruits are consumed and the kernels used in the processing of women’s leather aprons (ntepa). The other fruits are eaten fresh and are regarded as snacks. Some of the indigenous trees are used as firewood while others are used as shades around the households. Due to population growth and deforestation wild trees are

becoming more and scarcer. Production of indigenous wild trees could be encouraged through extension programmes. Table 4.10 is a summary of the indigenous fruits, which are found in Sekhukhune district.

Table 4.10: Indigenous wild fruits

Wild fruit in Northern Sotho	**Scientific name**
Mabilo/ Mmilo	Vangueria infausta
Mafaya	
Torofeie	Opuntia megacantha
Ditšhidi/ Matšhidi	Ximenia caffra Sond.
Dithetlwa	*
Dingole	*
Dihlopi	*
Dihlakauma	*
Kgopane	*
Menotolwane	*
Dikgoriri/ digoliri	*
Mampsyane	*
Marolo	*
Kgantsokorwane	*
Dikootla	*
Tseedi	*
Marula	Sclerocarya caffra
Dupe	*
Monokane	*
Dithapori	*
Dikgokgoma	*
Digwane	*
Mahlatswa	Chrysophyllum magaliemontanum Sond.

Dikgoto	*
Magogwane	*
Dinee	*
Bokokotane	*
Ditankane	*
Dikabosa	*
Dithobe	*
Magogwane	*
Dikgalo	*
Mothuhu	*
Marelerele	*
Disotlho/ ditshotlho	*
Mabupudu	*
Magogopitsa	*
Difarela-tshwene	*
Ditlhakolane	*
Dikgongpata	*
Mago a thaba	*
Dikonaona	*
Mopipi	*
Mahwahwa	*
Dikgampotokane	*
Ditogolwane/ ditokolwane	*
Motsonkutla	*
Monkgemane	*
Dikumo	*
Dikgalwane	*
Dithurumotswane	*
Dipidikwa	*
Dinamane	*
Ditlaume	*

Ditlwapi	*
Dithoronopyane	*
Dipola	*
Ditshuduntshu	*
Mmotswadieta	*
Mahola	*
Diphuroku	*
Dikantane	*
Dikgantshukudu	*
Manota	*
Dikgomoko	*
Maapara	*
Dikgweriri	*
Mohlono	Dovyalis caffra Sond.
Mburo	Vitex pooara Corb.
Morutlue	Strychnos pungens

* No English name

(g) Indigenous wild roots

Indigenous wild roots are also used as snacks. Due to hard labour involved in digging and gathering them they are currently scarcely used. The only roots, which are mostly gathered, are the roots of African potatoes because of its medicinal use. Research conducted by van Wyk and Gericke (2000:81-97) outline the indigenous roots, bulbs and tubers of the Bushman and the Zulus while both Quin (1959) and Coetzee (1982) failed to outline any tubers, roots and bulbs amongst Ba-Pedi. The research results outline thirteen different types of indigenous wild roots and tubers which are commonly used among Ba-Pedi in Sekhukhune district. Table 4.11 gives a summary of indigenous wild roots and tubers.

Table 4.11: Indigenous wild roots and tubers

Indigenous roots in Northern Sotho	**English**
Diro	*
Magaba	*
Mašoga	*
Moo	*
Lekootla	*
Mamorati	*
Motsonkutla	*
Dikgantsokorwane	*
Mankgemane	*
Dikgetswana	*
Kgelebetle	*
Dikgolokwane	*
Sekanama	African potato
Dikgenyane	*

* No English name

(g) The importance of indigenous wild foods in ensuring household food security

Although no detailed research has been done on the indigenous fruits and vegetables, several studies have been conducted elsewhere in central and southern Africa. Bukenya (1994), for example, has reported on "*Solanum macrocarpon*", which is used as a vegetable in Uganda. Bandeira (1994) listed 45 wild vegetable species at OInhaca Island in Mozambique while Mwanyambo (1994) listed 27 wild vegetables species in the Lower Shongwe Valley of Malawi. Maundu (1994) discussed the role of indigenous food plants in Kenya, and has highlighted the Indigenous Food Plants Programme (IFPP) which is trying to address issues around the preservation of the cultural heritage and the improvement of the nutritional base

for local communities. This is done by tapping indigenous knowledge about sustainable development and the conservation of genetic resources. In the Republic of South Africa, the Agricultural Research Council (ARC) is presently running an intensive research programme on the commercialization of *Cleome gynandra* (leroto) and *Amaranthus species* (theepe) (Van den Heever 1995).

The exploitation of wild resources of food was generally seen as a supplementary source of food. It gives household sources of vitamins and minerals or micro nutrients. Hunting, fishing, gathering insects, wild vegetables and fruits play a supplementary role in food procurement in Sekhukhune district. For the resource-poor households the gathering of wild plants for use as relish plays a more complementary role. In some households, uncultivated green leafy vegetables such as “theepe”, “leroto”, “letlwane”, “sekalerotwane” and “tshehlo” complement the cultivated leafy vegetables (both conventional and indigenous) as the main source of relishes. In households where they have other sources of relish, the gathering of indigenous wild plants for relish was mainly to add variety to the diet.

Wild fruits are regarded as a snack and are picked when fetching wood or looking after the cattle. The only wild fruit, which is gathered for processing is marula. Marula fruit is gathered, juice extracted, fermented and beer is made. Beer made out of marula can be used as a beverage and can be sold within the community. Research conducted by Quin (1959) indicated that marula juice has a high concentration of Vitamin C. Matšhidi (Ximenia caffra Sond) fruit also has vitamins. The kernel of matšhidi is burnt, grinded and used in the processing of “ntepa” (indigenous leather aprons worn by married women). In some of the villages in the research area there are projects which use the kernels of matšhidi to process these aprons using cattle and goat leathers.

The interlocutors indicated that it is illegal to poach and /or to hunt wild animals. They indicated that one requires a license to hunt or fish. Some of the wild sources are becoming less popular such as insects, termites and wild animals while others such as vegetables e.g. “leroto, theepe, sekalerotwane” and “thelele” are popular and well preferred sources of relish. It is also reported that some people especially

the younger generation, regard some of the wild foods as of low status (FAO 1997:148).

Indigenous knowledge to identify the edible plants is critical. Example: some of the wild species are harmful and poisonous. In addition one need the skills in picking the leaves otherwise old leaves are picked and they tend to be bitter, stringy and less palatable. Picking incorrectly can also harm the plants and prevent new growth of leaves and fruit. Some of the plants identified by the elderly people in the community were not known to or not regarded as food by the younger people. Elderly women often have very good knowledge of the indigenous species of green leafy vegetables (FAO 1997:145). Ogle and Grivetti (1985: 194-195) also noted the declining interest among younger people for traditional and wild food sources. This contributes to loss of both knowledge and skills in recognising climatically adapted food sources that have previously sustained societies.

4.3.3 Food production

(a) Land issues

According to the Ba-Pedi culture and tradition, land belongs to the chief (Kgoši) and is administered through the headmen (Mantona a mošate) for allocation to households. When the family has been allocated a piece of land, that land can be transferred from one generation to another (i.e. through inheritance) without the leaders` involvements. The chain of inheriting the land can be broken or stopped depending on changing circumstances. The chief and the headmen can authorise the use of that particular land for any other purpose if the family has decided to stay in a different village under another leadership. In rural areas land is allocated to the head of the household. Land allocated for production differs from one household to the other in terms of the sizes. Table 4.12, outlines land allocation per hectare and the percentages thereof.

Table 4.12: Land allocation per size, frequencies and percentages

Size of the land	Frequency	Percentage
<1 hectare	11	3.64%
1<2 hectare	253	83.77%
2<3 hectare	32	10.60%
More than 3 hectare	1	0.33%
Other/yards	5	1.66%

Out of a selected sample of 355 interlocutors, nearly 84% own less than two hectors of land to produce their crops. Due to population growth some households are without fields for crop production. Therefore, indigenous crop production should be seen in line with the total land allocated per household.

(b) Crop production issues

As soon as the first rain falls in October/November, farmers cultivate their crops. Some farmers use power driven tractors while others use animal drawn plough while others use hand hoes depending on the size of the land and affordability. Communities in Sekhukhune district use intercropping or mixed cropping. They are little concerned about inbreeding and use seed from previous year crops. Seed selection is, however, commonly practiced before planting. Only large, healthy looking seeds are selected. Table 4.13 gives a summary of the indigenous crops which are commonly cultivated.

Table 4.13: Indigenous crops cultivated in Sekhukhune district

Food crops in Northern Sotho	**Food crop in English**	**Scientific names**
Mabele thoro	Sorghum	Andropogon sorghum orHolcus sorghum
Leotša	Millet or Pearl millet	Pennisetum spicatum Koern & vars
Lehea	Maize	Zea mays L.
Monawa	Cow pea	Vigna sinesis Endb.
Phootla/ Ditloo marapo	Bambarra ground nuts / Njugo bean	Voandzeia subterranea
Dihlodi	Mung beans	Phaseolus aureus L.
Mogapu	Water melons	Citrullus vulgaris Schrad vars.
Mofodi	Pumpkins	Cucurbita pepo L.
Moraka	Gourds	Lagenaria vulgaris ser.
Digo	Calabashes	*
Ntsho/ Nyoba	Sweet reeds	Sorghum vulgare Pers. Var Saccharatus Korn
Diponkisana	Small white beans	*
Marotse	Citron/ stockmelon	Citrullus vulgaris Schrad Ex. E and Z.

* No Scientific name

The research results indicate that out of the total crops produced in 2004-2005, 76% of the farmers produced maize; 22% produced sorghum while 3% produced millet. Although millet and sorghum are said to be drought resistant, the interlocutors indicated that currently maize seems to be given a higher preference as compared to sorghum and millet. This has implication for agricultural extension in Sekhukhune district. Literature reviewed indicated that Sekhukhune district is a dry land area. Therefore, there is a need to promote the production of drought resistant crops such

as sorghum and millet. Some of the reasons for low production of sorghum and millet were that these crops are easily attacked by birds. The other reason was that they do not have a market to sell them. Therefore, for the communities to increase production of this indigenous crop there is a need for marketing strategies, which if available, all the farmers within a village can plough the same crop in one season to manage bird attacks i.e. if all the fields were cultivated the same crops birds attack will be minimal per field as opposed to when majority of fields has planted maize.

When interlocutors were asked whether they could plant indigenous crops annually, 99% indicated a willingness to produce them while 1% indicated that they prefer modern crops such as maize and wheat. These percentages indicate that if indigenous crops are promoted through extension the farmers can produce indigenous crops despite the problems mentioned above i.e. if a market can be established and the risk for marketing, storage and transportation are reduced. Production of crops is normally controlled by the head of the household and if the head of the household is not available, any member of the household can take over i.e. the wife or the elderly children. Out of the total population, 47% indicated that they use commercial fertilizers and or kraal manure while 53% do not use any fertilizes. The result indicates that a higher percent of the farmers do not use fertilizes due to the following reasons:

- the cost of inorganic fertilizers is high
- if fertilizers are used and farmers experience drought the cultivated crops die quickly
- Kraal manure is limited in the communities because of lack of domestic animals such as cattle
- the labour intensive work of digging, transporting and applying kraal manure
- time constraints in the application of organic manure

The farmers were further asked as to whether they use crop rotation. Table 4.14 outlines the results.

4.14 Percentages and frequency table outlining crop rotation

Crop rotation	Frequency	Percentage
Yes	110	36.67%
No	190	63.33%

Table 4.14 indicates that a higher percentage (63%) of the farmers do not use crop rotation in their fields. They plant the same crops year after year using multiple cropping within their field to ensure variety and household food security. Research conducted by Whiteside (1998:63) support the production of indigenous crops using a case study which says: "… recent interviews in southern Angola indicated that farmers consciously reduced their dependence on maize and returning to small grains because of recurring droughts in the area. The current drought in Sekhukhune district necessitated more production of indigenous crops as opposed to exotic ones.

The farmers were asked as to whether they are interested in trying new crops that they never planted before. Seventy seven percent (76%) of the farmers indicated that they were interested in trying new crops on condition that the crops will be more marketable than their usual crops while 23% were not keen to try new crops. They then outline the problems related to the introduction of new crops. Some of the problems perceived were:

- lack of advanced technology
- lack of fences around their fields to protect the crops
- lack of credit/ capital to start commercial farming
- lack of water to irrigate their crops
- Poor marketing and management skills.

These problems and many others compelled the farmers to stick to what they frequently produced rather that taking the risk of introducing new crops.

(c) Weeding and thinning

Weeding is mostly started in December and carried on to January of the following year. Women are involved in weeding and thinning. Indigenous gatherings such as “matšema” are used to hasten the weeding process. “Matšema” is the gathering of women and or men to increase man power without having to pay the participant any salary. The participants are paid in kind i.e. food will be prepared for them. Along the weeding process women gather indigenous vegetables and start processing and preserving them. These indigenous vegetables might be wild while others come from cultivated crops such as cowpeas, pumpkins, water melons, citron and gourds.

(d) Disease and pest control

When asked on how they control diseases and pests in their fields, 80% of the interlocutors indicated that they never experienced problems with pests, while 20% indicated that they don’t have money to buy pesticides even in instances where they are faced with such problems.

4.3.4 Harvesting and processing

The first crop to be harvested is vegetables followed by gourds, fresh cowpea (dinyebu) and green mealies (mahea). Harvested vegetables from cowpeas, water melon, citron and wild vegetables are cooked, mashed, small pellets (go khuša) made on top of a corrugated iron sheet and dried. Vegetables such as pumpkin leaves are picked washed and shade dried to retain their colour and possible nutrients. By harvesting them in early February- April the community would say “re ja lehlabula” meaning we consume the first crops of the year.

In June/July the rest of the crops are harvested. Harvesting is determined by the dryness of the crops. In preparation for the harvesting process each household would build a threshing platform (seboya) in the fields or at household level. The crops such as millet, sorghum, cowpea and bambarra nuts are threshed by hands

using indigenous tools such as “morogo” and “pato” (threshing stick). Threshing is done to add value to the crops and to facilitate storage. Maize will be removed by hand from the maize cobs and poured into bags. Nearly ninety-eight percent (98%) of the interlocutors indicated that they use the sun to dry their crops. Indigenous tools and methods (for crop processing) were used by all the interlocutors.

Crops harvested in 2004-2005 were statistically analysed in terms of mean and standard deviation where the minimums and the maximums were calculated. Table 4.15 outlines the results.

Table 4.15: Crops harvested in 2004 – 2005

Variables/ crops	**Minimum bags produced**	**Maximum bags produced**
Maize	2	30
Sorghum	2	18.5
Millet	1	14
Cowpeas	.5	6.5
Bambarra nuts	.5	4.5
Mung beans	.5	4.5
Small white beans	.5	3.5

The highest crop which was produced by the farmers was maize which on average the minimum of maize bags produces in 2004-2005 was two (2) bags while the maximum was thirty bags (30) per household. Sorghum was the second with a minimum of 2 bags and a maximum of 18.5 bags per farmer. These results indicate that if indigenous crops are promoted there is a possibility of increasing their production.

4.3.5 Food preservation, storage and marketing

Preservation methods differ from one crop to the other and from one household to the other. If production is high i.e. eighteen bags of sorghum, some of the bags are taken to the local mill for storage while a minimum amount is mixed with aloe ash and stored at household level. The use of aloe ash is practiced in Sekhukhune district to store seeds which can be used for planting in the next season. Aloe ash can preserve the seeds of sorghum, mung beans, cow peas and millet. The seeds of sweet reeds are stored on the roof of a firehouse so that the smoke from the fire house will prevent weevils attack. Table 4.16 indicates the minimum and maximum bags of crops stored till the following year.

Table 4.16: Crops stored (2004-2005 between winter and summer months)

Variable /crops	**Minimum stored per bag**	**Maximum stored till the following season per bag**
Maize	.5	.5
Sorghum	.25	1
Millet	.25	.5
Cow pea	.25	.5
Bambarra nuts	.25	.5
Mung beans	.25	.5
White small beans	.5	.5

On average the maximum of half a bag is stored as seeds to be utilized in the following planting season. Storage facilities differ from one household to the other. Some interlocutors indicated that they store their seeds in clay pots and calabashes (they close the calabash with cow dung to prevent weevils attack), while others store

them in buckets in instances where they no longer have clay pots to store them. The clay pot method is preferred because it keeps the seeds cool.

The surplus produced each year may be consumed, bartered, sold locally or sold at the cooperative i.e. OTK mill in Marble Hall. Table 4.17 gives a summary of minimum and maximum bags and how they were utilized by farmers in Sekhukhune district.

Table 4.17: Crop utilization in Sekhukhune district

Type of crop	**Bags bartered**		**Bags sold locally**		**Bags sold at the cooperative**	
Quantity/ bag	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Maize	.5	8	1.5	13	2	22
Sorghum	.25	2	1	10	1	14
Millet	.5	1.5	2	2	1.5	14
Cowpea	.25	1	.5	4	1	4
Bambarra nuts	.25	1.5	.5	1	1	3
Mung beans	.25	.5	.5	.5	1	3
White small beans	.5	3	.5	.5	.5	.5

On average the maximum bags of sorghum and millet sold at the cooperative (per household) was fourteen (14) bags while that of maize was twenty two (22) bags. When the surplus was subjected to frequency and percentages, out of a total of 355 farmers 98% indicated that they produce surplus which can be utilized as indicated in table 4.17. This table indicates that there are multiple purposes of producing indigenous crops. These purposes go beyond consumption as indicated above. The implication of these results to extension is that extension should promote multiple uses of indigenous crops and help the farmers to expand their market i.e. how can the indigenous crops be promoted to be part of the global economy as an input to globalisation. That is, farmers should produce and sell their crops beyond their

villages while ensuring that what they produce alleviates poverty in Sekhukhune district. Currently nearly 62% of the farmers sell their crops to the cooperative in Marble Hall while 32% sell their surplus within their villages. The remaining 6% do not have any surplus to sell and they consume all their produce at household level.

Farmers were asked about their total earnings from the crops sold. The maximum percentage of the money earned was R1 000.00 per individual farmer while the minimum was R500.00. Farmers were further asked as to whether they have marketing problems. All farmers narrated their marketing problems which are summarized below as follows:

- The cooperatives are few and they determine the prices for the farmers rather than the farmer determining the prices.
- The cooperatives claim that the crops produced by black farmers are of low quality justifying the reasons to pay the farmers less money.
- They buy the crops after the harvest and they then sell the same crops to the farmers at a higher price (double the prices).
- To store the crops at the cooperative silos increases the cost of the price of a bag of refined maize of sorghum or millet in time of need
- Transportation costs are a barrier
- The farmers are not aware of other marketing channels to sell their crops.

Whiteside (1998: 152) summarized the marketing problems as follows: “marketing liberalisation has resulted in increased differentials between cereal sale price (farm gate) received by farmers and cereal (or maize meal) price charged by retailers. This is particularly disadvantageous to poorer farmers, who sell grain soon after harvest to meet urgent cash needs (to pay off debts etc.) and then purchase grain or maize meal later in the year. In Malawi, the maize purchased later in the year may cost twice as much per kilo as the farmer first sold it for” (Whiteside 1998: 152).

These problems create an assumption that farming is not a carrier. The farmers were asked to come up with proposals towards the solution of their problems. All the farmers suggested that the government should assist them by regulating the prices,

erecting silos which might charge the farmers a minimal amount of money, helping farmers to establish the market beyond the current monopolistic system.

4.3.6 Food preparation and utilisation

One of the major reasons for crop production is food consumption. When the total harvest was statistically analysed the results indicated a minimum and maximum number of bags consumed per household. Table 4.18, is the result of the consumption patterns per crop.

Table 4.18: Minimum and maximum crop consumption per year (2004-2005)

Variable/ crops	Minimum consumed bags	Maximum consumed bag
Maize	1.5	16
Sorghum	1	10
Millet	1	8
Cowpeas	.25	5
Bambarra nuts	.25	4
Mung beans	.25	4
White small beans	.5	3

The above table indicates the consumption of crops produced in 2004-2005. The interlocutors indicate that they produce different crops to ensure food variety and to ensure household food security. The consumption patterns of vegetables were not statistically calculated because they were randomly consumed without any quantification of how much they were consumed. Some vegetables were preserved by drying and dehydration processes while others are cooked and later dried i.e. cowpeas leaves.

Indigenous relish plants (vegetables) are picked by women and girls. Picking requires indigenous knowledge of the identity of the plants as well as the parts to be picked. Such knowledge is obtained through experience by participating during picking. The uprooting of plants and the removal of branches (in the case of larger plants) is usually forbidden so as not to kill the plant and to ensure its continual growth. This is especially the case with culturally significant plants, for example relishes that have medicinal properties.

Picking is done with the fingers and only the soft, tender leaves, fruits and flowers are harvested i.e. pumpkin leaves. Picking methods differ depending on the relish. In some cases special care must be taken, as certain parts of a plant may be poisonous. Relishes that are cooked together can be picked together and placed in the same container i.e. pumpkin leaves and pumpkin flowers. Some relishes are not picked together or placed in the same container because their cooking time varies i.e. cowpeas leaves (take a longer time to cook) and pumpkin leaves (takes a shorter time to cook). Picking is always followed by cooking on the same day, except where picked indigenous vegetables are to be preserved in dried form for future use. Traditionally relishes were served three times a day i.e. at breakfast, lunch and supper. Relishes were served either warm or cold. It is a tradition of Ba-Pedi to serve the relish and cereal porridge separately.

Relishes are always cooked before serving. The time for cooking varies from one relish to another. This is done to make them suitable for consumption with cereal porridge. Cereal porridge is prepared from maize, millet or sorghum meal. Water is boiled when cooking porridge. Recipes for the preparation of porridges and relishes are supplied by Coetzee (1982). Ingredients frequently used during relish cooking include water, salt and tomatoes. In exceptional cases condiments such as marula kernels are added to the relish to enhance flavour.

4.3.7 The contribution of indigenous foods towards household food security

One of the major challenges facing South Africa today in particular is to alleviate poverty and to ensure household food security. Owing to the complex nature of the environment in Africa and South Africa in particular, new and innovative solutions to the problems of food insecurity need to come from within and/ or outside South Africa, drawing from Africa's indigenous knowledge systems and from Sekhukhune district of Limpopo province in particular. A food preference and consumption frequency list of selected indigenous foods was conducted among 355 interlocutors to test the consumption of indigenous foods. The results are outlined in table 4.19.

Table 4.19: Indigenous food preferences and consumption percentages

Type of indigenous food product	**Highly desirable (total % of interlocutors)**	**Less desirable (total % of interlocutors)**
Sorghum	98.58%	1.42%
Sorghum beer	72.85%	27.15%
Sweet reed	97.44%	2.56%
Millet	88.56%	11.44%
Cow pea	99.44%	0.56%
Bambarra ground nuts	98.58%	1.42%
Mung beans	96.32%	3.68%
Peanuts	98.58%	1.42%
Pumpkin	100%	0%
Water melon	99.72%	0.28%
Citron	97.44%	2.56%
Gourds	97.17%	2.83%
Pumpkin leaves	98.87%	1.13%

Water melon leaves	95.38%	4.34% + 0.29 %
Cowpeas leaves	98.58%	1.42%
Gourd leaves	91.57%	8.43%
Tšhima	97.99%	2.01%
Ting	97.74%	2.26%
Dikgobe	99.72%	0.28%

Table 4.19 is a summary of the total percentages (out of 355) of interlocutors who consume indigenous crops as opposed to a lesser percentage which does not consume them. On average we can conclude that indigenous crops and vegetables are highly consumed. The above conclusion has positive implications that require extension to promote the production and consumption of indigenous foods.

On a scale of five the interlocutors listed the five most preferred foods as follows:

- 1. Pumpkin (100%)
- 2. Water melons and Dikgobe (a mixture of bambarra nuts, cow pea, peanuts and samp) (99.72%)
- 3. Cowpeas (99.44%)
- 4. Pumpkin leaves; sorghum; bambarra nuts; peanuts and cowpea leaves (98.58%)
- 5. Tšhima (97.99%)

All of the interlocutors (100%) indicated that indigenous food products listed above, contribute to their household food security. According to Wolf (1986) at least 3000 million people living in Sub –Saharan Africa are dependent on resource-poor agriculture for their livelihoods, i.e. as the main source of survival. Despite their conditions and the inadequacy of the conventional agricultural development models, farmers living in these areas have managed to survive. Plants continue to provide most of the communities in Sekhukhune district`s food ingredients. Traditional societies have always exploited edible wild plants to provide an adequate level of

nutrition. These plant resources play a very significant role in nutrition, food security and income generation.

Indigenous vegetables are the most important foods to provide household food security. They are typically consumed in conjunction with the common staples such as sorghum, millet or maize meal. According to Hart (2005: 250), their importance is attributed to the following commonly held viewpoints:

- They grow easily,
- Most of them are wild species and they thrive easily after the first rain falls,
- They require less external inputs such as mechanisation and agro – chemicals,
- The cultivation practices of Indigenous vegetables are adapted to locally available resources,
- They are possibly more nutritious;
- They are cheaper to purchase as compared to exotic vegetables;
- Their current cultivation is in line with sustainable agriculture and is continually adapted to meet changing circumstances.

Vegetable crops in the indigenous food system include pumpkin leaves, cowpea leaves, cleome, pigweed and water melon leaves (motšhatšha). The cultural practice of eating indigenous, leafy vegetables and legumes adds vital nutritional elements to the traditional African diet, namely good vegetables are a source of vitamin A and C while protein is derived from the legumes such as bambarra ground nuts and cowpeas (Franz 1971, Leary 1964 & Quin 1959; 1964).

During the time of research, the researcher observed street vendors in Groblersdal town, selling indigenous vegetables such as fresh Cleome (leroto), Pigweed (theepe) and dried cowpea leaves. They indicated that by selling indigenous vegetables they obtain money which is used to buy commercial basic foods such as sugar, cooking oil, salt and bread which are essential for household food security.

The interlocutors indicated that if their crop production is high (average of sixteen to twenty bags per yield per year) they sell some of the surplus obtained to pay school fees for their children and to buy other basic necessities such as food and clothing. Therefore, the promotion of indigenous food crops would benefit both producers and consumers. The producers would increase consumption from their own production and generate income by selling their produce in the local market, where increased varieties of foods would be available to consumers that do not produce them. Increased production of a range of indigenous food crops, particularly staples such as millet, sorghum and or maize, would increase the food supply and thus contribute to reducing the importation of food.

When interlocutors were asked the question “who take the marketing decision within their family”. Forty- seven percent (47%) indicated that both the husband and wife decided on what to sell and where to sell it. Thirty nine percent (39%) of the interlocutors said the husbands decide what to sell while 11% indicated that the mothers decide what to sell. The findings indicate that in the current communities’ decision making processes is increasingly becoming a common venture between husband and wife, which was not a common feature of the traditional Ba-Pedi culture as described by Quin (1959). This has implication for agricultural extension officers in the sense that their innovation to ensure household food security should focus on both men and women.

As far as food utilization decisions are concerned, 61% indicated that the mothers are the ones deciding what to prepare and what to be served, while 37% indicated that it is a joint decision making process within the family where the mother, grandmother and the children might decide on how indigenous foods should be prepared and served while the last 2% indicated that any member of the family (including men) can take food preparation decisions. The implication of this results are that mothers should be well equipped in nutrition to ensure that food prepared meet the minimum requirements of a balanced diet, and that methods used in food preparation preserve essential nutrients such as vitamins, minerals and proteins, which are mostly found in indigenous and/ or exotic vegetables.

No one department, discipline or profession can solve the problems related to poverty and food insecurity. Therefore, the extension officers should use a multi-sectoral and interdisciplinary approach to nutrition security. This imply building capacity by making collaborations with agriculturalists, nutritionists, home economists and researchers so that projects activities are planned and implemented collaboratively to address all issues relating to indigenous food production, processing, preservation and utilization to ensure household food and nutrition security. The extension service should compile more information on indigenous foods and develop appropriate packages for field work extension service. They should also develop methodologies for impact assessment, monitoring of progress, and evaluation. Further research could be done to develop new low-cost, ready to eat products and other convenience foods, based on indigenous food crops for both the rural and urban markets. This would help to increase consumption and the demands for indigenous food crops. Table 4.19 indicated that indigenous foods are valued, therefore, there is a large potential for development in this area and, if appropriately managed and supported, it would increase income generation for the rural farmers. Regional recipe books could also be developed to ensure that the younger generation who do not know how to prepare indigenous foods could use the book as a source of reference.

4.3.8 The link between indigenous foods and nutrition security

Indigenous agricultural foods can influence human nutrition in a numbers of ways – for example through changes in and access to income; food prices and their variability; labour allocations, particularly of mothers and caregivers; energy and nutrient expenditure and nutrient composition of foods (Mebrahtu et al, 1995). When indigenous agricultural products such as millet, sorghum, cowpeas and bambarra ground nuts are sold in the market place, the income earned may be used to purchase goods and services that contribute to nutritional well-being. Similarly, when those products are consumed directly by members of the producing household, their dietary intake is improved. It would seem, therefore, that indigenous agricultural food production, processing, preservation and utilization can make a direct contribution to improving nutrition. Unfortunately, sometimes this does not happen due to lack of

nutritional knowledge. Therefore, there is a need for Agricultural extension workers to encourage the farmers to produce indigenous foods and to promote their consumption by individual household members so as to ensure good health.

Research conducted by Franz (1971), Monnig (1967) and Quin (1964) emphasised the consumption of the following two insects: locusts and mopani worms while Dafour (1987) indicated that over 20 species of insects are collected by the Tukanoan Amerindians of Colombia. He further argued that beetle larvae, ants, termites and caterpillars are the most commonly consumed. They are most abundant during the rainy season when they can contribute between 12% and 26% of the crude protein from animal sources for men and women respectively (Dafour, 1987). Although the consumption of beetle larvae, ants, termites and caterpillars has decreased in Sekhukhune district, research conducted in other countries indicated that they are a rich source of proteins equivalent to what is found in “goose liver, pork sausages and beef liver respectively” (Dafour, 1987: 383-397).

Wild foods are a part of the rural people’s diets not only during periods of food shortages, but also on a daily basis. Most dietary studies emphasize the value of calorific intake from staple foods such as maize, millet and sorghum. However, the amounts of wild foods consumed, their frequency of consumption as well as their nutrient contents, have also been explored by previous researchers such as Quin (1959; 1964). It is this daily consumption of indigenous foods which contributes to overall nutritional well-being. Table 4.19 outlines some of the indigenous foods which are commonly liked and consumed by the interlocutors and their family members in Sekhukhune district. Foods such as “tshima, dikgobe, semotwane”, cowpeas and bambarra ground nuts are rich in both protein and carbohydrates. Indigenous vegetables such as pumpkins, pumpkin leaves, water melon, water melon leaves and cowpea leaves are rich in micro-nutrients and vitamins. Therefore, the consumption of indigenous foods will ensure nutrition security.

4.4 Policy issues

Ninety percent (90%) of the interlocutors indicated that they received the service of extension workers while 10% indicated that the extension workers in the new South Africa are failing to offer them any service. Twenty eight percent (28%) of the interlocutors were not sure of the actual service to be rendered to them. Although a higher percentage indicated that they do have the service of extension workers, 88% indicated that extension workers do not promote indigenous crops, indigenous fruits and vegetables and any indigenous knowledge system.

None of the interlocutors were aware of the extension policy and the integrated food security policy of the country. The implication for lack of knowledge regarding policy issues is huge in Sekhukhune district not only to the farmers but also to the extension workers themselves. The failure of extension workers to promote indigenous crops is assigned to lack of policy documentation, which outlines how indigenous knowledge system should be incorporated into the main stream of extension.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The purpose of the study was to examine the current indigenous food systems in the field of food gathering and production of selected rural communities in Sekhukhune district of Limpopo Province.

The following were the specific objectives of the study:

1. To identify the indigenous food gathering and production systems in Sekhukhune district and prioritise them.

2. To compare the indigenous food systems of the target communities as recorded in literature and their food systems with specific reference to their food gathering, production, processing, storage and utilization.

3. To find out the contribution(s) of indigenous food systems to household food security and the livelihood of the rural communities.

This study used quantitative and qualitative methods to look into food gathering and production of selected rural communities in Sekhukhune district of Limpopo Province in South Africa.

The study therefore focused on the following aspects:

- Identification and description of indigenous gathered foods, their processing, preservation and utilization.
- Identification and description of indigenous food production, processing, preservation, storage and utilization.
- Identification of indigenous foods which contribute to household food security

This chapter deals with the following aspects:

- A summary of the findings,
- Conclusions and
- Recommendations to all stakeholders.

The research was carried out in two phases namely, phase one (workshop data collected from (forty two extension workers) and phase two (data collected from the three hundred and fifty five farmers). The summary of the findings will highlight important themes derived out of the two phases.

5.2 Summary of the findings

The findings of this research were clustered into four main themes namely:

- Socio demographic characteristics of the farmers and its implication to agricultural extension in Sekhukhune district
- Indigenous food gathering
- Indigenous food production, processing, preservation, storage and utilization
- Institutional policy issues

5.2.1 Socio demographic characteristics of the farmers and its implication to agricultural extension in Sekhukhune district

The results revealed that the people in the research area are mainly Ba-Pedi who speaks Northern Sotho. Since the indigenous foods are mainly consumed by Ba-Pedi most of the foods are named in Northern Sotho only. Women have more indigenous knowledge than men especially in vegetable gathering, processing and preservation.

The results indicated that in the research area majority of farmers are females. Therefore, agricultural innovations should be directed to both men and women. Women should be encouraged to share their indigenous knowledge of food gathering and farming experiences with their children through socialization process. Tabulation of age frequencies also indicated that a large percentage of the farmers are the elderly while a lower percentage falls between the ages 20 to 40 years. This has implications for the current and future extension because in essence it implies that extension should have a paradigm shift from the elderly to the youth.

The educational levels of the interlocutors were very low but the same group with more informal education had more indigenous knowledge in food gathering and production. The concept interlocutor was adopted in honour of their knowledge and experiences. The interlocutors indicated that their indigenous knowledge of agriculture was never part of education system or the extension programmes. The results indicate a need to incorporate this knowledge gap into the main stream of education. It can be concluded that the Ba-Pedi culture is oriented towards passing indigenous knowledge and experience from one generation to the next.

The majority of the interlocutors were part-time and seasonal farmers. To the farmers, agriculture becomes` part-time activity because of their dependence on rain fall as their only source of irrigation. Even in areas closer to the dams and rivers the farmers adopted a seasonal farming or no farming at all, due to technical and financial problems. The majority of the farmers earn an income which is below the

poverty line. Therefore, the promotion of indigenous crops could help the farmers to improve their food security and to sustain their livelihoods.

5.2.2 Indigenous food gathering

Hunting of indigenous wild animals was confined to fishing and collection of beehives by herd boys. The most commonly gathered foods were fruits and vegetables. In the gathering, processing and preservation of fruits and vegetables, farmers' indigenous knowledge is a key factor when they are in season. All farmers consume indigenous vegetables and fruits. This knowledge is acquired through the socialization process. Gathering indigenous wild fruits and vegetables ensure household food security and sustainable livelihoods. The whole process is age and gender specific where women have more knowledge than men.

When the responses of the farmers in relation to indigenous knowledge were compared to that of the extension workers, the farmers had more knowledge of the indigenous fruits and vegetables than the extension workers. The implication of this to the current extension programmes is for extension workers to sit back and begin to learn from the farmers. Chambers (1983:189) stresses that professionals (extension workers) should sit down and learn from the rural communities. What is learned should be documented and incorporated into the main stream extension i.e. creating income generating activities by utilizing some of the indigenous fruits and vegetables. Due to population growth and deforestation wild trees are becoming scarce. Production of indigenous wild trees could be encouraged through extension programmes. Accelerating population growth, ecological hazards and change in market supply and demand make it necessary for both scientists and agricultural extension workers to maintain a constant search for improved varieties of major indigenous crops and to diversify production by developing locally grown but underutilized indigenous crops.

5.2.3 Indigenous food production, harvesting, processing, preservation, storage and utilization

The majority of the farmers in the study area own less than two hectors of the land. Due to population growth some households are without fields for crop production. There is sexual division of labour and marginalization of women in the use of technology. Indigenous gatherings such as “letšema” are done to increase labour output and to hasten the weeding process. Such communal gatherings are seen to be paid in kind where only food will be served for the participants. The “letšema” co-operatives are currently fading in rural communities robbing the rural communities an indigenous potential source of labour.

The most important crops produced in 2004/2005 were maize, sorghum and millet. The research results indicate that out of the total crops produced in 2004-2005, 75.57% of the farmers produced maize; 21.59% produced sorghum while 8.84% produced millet. Although millet and sorghum are said to be drought resistant, the farmers indicated that currently maize seems to be given a higher preferences as compared to sorghum and millet. This is due to the fact that there is a market for maize and that maize is not affected by birds.

Due to technical and financial reasons only a limited number of farmers use commercial fertilizers and kraal manure. To ensure food variety and food security the majority of farmers prefer multiple cropping to crop rotation. Inspite of many problems associated with introduction of new crops the majority of farmers are still interested in trying new crops.

When farmers were asked about the division of labour in crop production, it seems women were more involved in weeding, thinning and harvesting indigenous vegetables and crops. Women were also involved in processing, preservation, storage while marketing was assigned to the men. The farmers indicated that it is within their culture and indigenous norms, that the division of labour seems to favour men as opposed to women. Rather than viewing the situation as oppression, women view it is a way of fulfilling their gender roles in society.

Aloe ash is viewed as the most cost effective way of preserving seeds for the next season. On average the maximum of half a bag of crops is stored as seeds to be utilized in the following planting season. However, the bulk of the surplus produced each year may be consumed, bartered, sold locally or sold at the cooperative. More maize than sorghum and millet is sold at the cooperatives. Earnings from crop production range below R500 and R1 000.00.

Farmers have marketing problems and suggested government intervention through erecting silos closer to the villages, expose farmers to the markets beyond the current monopolistic ones, empower extension workers in sales and marketing so that they will be in the position to help the farmers throughout the whole process from production to marketing.

5.2.4 The contribution of indigenous foods to household food security and sustainable livelihood

Women farmers indicated that they gather indigenous vegetables, which are used as relish. They produce different crops to ensure variety and sustainability. Indigenous methods of food gathering and production are currently used to ensure food variety and household food security. The role of women as gatekeepers, crop producers and gatherers should be acknowledged in ensuring food availability, accessibility and utilization. Indigenous knowledge plays a vital role in ensuring household food security i.e. vegetable processing, storing seeds in clay pots and mixing them with aloe ash.

5.2.5 The consumption of indigenous crops at household level

One of the objectives of the study was to compare the indigenous food systems of the target communities as recorded in the literature and their current food systems. Literature reviewed (Quin, 1959; Quin, 1964; Coetzee, 1982; Khumbane, 2004) indicated that the rural communities in Sekhukhune land (now district) consume indigenous crops. The research results indicate a high consumption of indigenous

vegetables at household level, while crops such as millet and sorghum are produced and consumed at a minimal due to low production rates.

5.2.6 Institutional policy issues

Except for a few farmers who are not aware of the services provided by extension, the majority of the farmers were satisfied with extension services. The majority of the farmers strive to promote production of indigenous crops even though at a minimal. Farmers were not aware of the current policy issues and how the policies impacted on their agricultural production system.

5.3 Conclusions

While South Africa is food secure at national level, household food insecurity is still a reality in Limpopo province and in Sekhukhune district in particular. Hence, the emphasis on both national and household food security by the Ministry for Agriculture and Land Affaires (2002) was done. Therefore, there is a need to promote indigenous food systems such as food gathering, production, processing, preservation and utilisation in Sekhukhune district as a way of ensuring household food security and sustainable livelihoods.

This study proves yet again, as previously concluded by a research conducted by Hedden-Dunkhorst and Mollel (1999:93-107) on small scale farming and extension in South Africa's Limpopo Province, that in areas such as Sekhukhune district, small scale farmers still produce indigenous food crops as their main food production activity and that subsistence farming is the major objective of small scale farmers in Limpopo Province. The findings of this study also indicated that the rural communities still rely on food gathering and production of indigenous crops for their livelihood and to ensure household food security.

In Sekhukhune district, the gathering and production of indigenous food crops remained a source of subsistence especially for the poor and for women in particular. Indigenous food crops are very important for their nutritional quality and they

contribute to a minimal source of income which is used to buy other basic foods and school uniforms for children. However, some of the indigenous foods are increasingly undervalued despite their nutritional content i.e. insects. A better knowledge of their production, processing, potential utilization, and constraints attached to their transformation and commercialization is an essential element and a prerequisite for their promotion through the current extension system. Such a process will only be possible if guided by a holistic approach and support by the government.

There is overwhelming evidence that the existing smallholder agriculture in indigenous crop production has the potential of creating employment, generate income and contribute to household food and nutrition security. The realization of the potential in the country can be assured by the practical implementation of the contents as reflected in the South African Agricultural Policy (Ministry of Agriculture and Land Affaires 2002). Furthermore, from the findings of the study the following conclusions were reached:

(i) Indigenous wild and cultivated food in the agricultural systems often fit a particular seasonal niche. They may provide green vegetables early in the rainy season, or can be dried and stored for the dry season. They may also provide counter seasonal food with fruit bearing in the dry season when little else is available. Wild foods may be particularly important in years when harvests fail.

(ii) There are more women farmers than men. These women have more indigenous knowledge of food gathering, production, weeding and thinning, processing, preservation and preparation while men are more involved in the marketing of produced crops.

(iii) Socialization plays a major role in the acquisition of indigenous knowledge of the farmers. Farmers in Sekhukhune district often form informal mutual-help groups known as “letšema”. They usually consists of four to six, sometimes up to 10 or more members, who help one another with labour-intensive agricultural activities such as land clearing, preparation, planting,

weeding and harvesting. The researcher concluded that “letšema” should be promoted as part of extension programs.

(iv) Indigenous crops gathered and/ or produced contribute to sustainable livelihoods, household food and nutrition security.

(v) Food gathering, hunting and fishing played a supplementary role in the household food supply. The gathering of wild leaves as a source of relish, however, plays a significant role in complementing the food that is produced and bought. These wild sources of food can contribute to protein (e.g. game, fish and insects) and microelements and vitamins (leafy vegetables and fruits). Unfortunately, some of the wild sources of food such as insects and termites have lost popularity. The possibility of incorporating wild source of food into the extension programs of Sekhukhune district needs further investigation.

(vi) Indigenous plants not only provide food for people and domestic animals, but are also used for pharmaceutical products and raw materials by industries. Accelerating population growth, ecological hazards and change in market supply and demand make it necessary for scientists and agricultural extension both to maintain a constant search for improved varieties of major indigenous crops and to diversify production by developing locally grown but underutilized indigenous crops.

(vii) The current communities have more knowledge of indigenous fruits (eighty species) and vegetables (forty species) as compared to what is written in previous literature, as far as Sekhukhune communities are concerned. Previous research conducted by Quin (1959, 1964) in Sekhukhune land, indicated that there are twenty indigenous vegetables and nine indigenous fruits. Literature reviewed for other countries revealed a rich source indigenous foods in countries beyond South Africa, however, there is a need to conduct more baseline studies in different provinces in South Africa so that data collected should be used in joint publications, data bases and extension training manuals.

(viii) Agricultural research and extension programmes must integrate food considerations of the communities served to ensure that technologies developed and projects designed respond to the needs of the community. The role of indigenous technologies and knowledge systems i.e. relating to crops and indigenous wild sources of food must be promoted. Aspects of post-harvest handling, especially for resource-poor households, must also be incorporated.

(ix) Food gathering has positive implications for the current agricultural extension programme in the sense that the information gained could form a baseline data for the development of new programmes such as beekeeping; rabbit production; fish ponds; the cultivation of indigenous vegetables i.e. “leroto” and “theepe”; indigenous fruits i.e. “marula” and “mabilo” trees which, if cultivated, can be used for income generation.

(x) Although the research results revealed a number of indigenous fruits (80) and vegetables (40), there is a need for further research where the botanical and English names of the species identified will be tabulated and a colourful catalogue of the said species developed. The nutritional contents of the said species need to be analyzed so that their promotion should be tied with their nutritional quality and quantity.

Based on the findings of this study, it is concluded that while poverty and inequality is observed and felt at household level, it needs the government to have a strategy to create indigenous productive consumers by encouraging the farmers to return to their productive activities especially in communities which abandoned their field. Such an effort will only be possible if supported by funding, appropriate technology and extension service, which starts and premised from the indigenous knowledge systems perspective.

5.4 Recommendations

The following recommendations are made based on the results and conclusions of the study

5.4.1 To the farmer

(i) Farmers should be made aware that their indigenous knowledge of food gathering and production is valued and that there is a need to document it so that future generations could learn from it.

(ii) Farmers should seek new market ventures for their indigenous crops to avoid monopolistic outlets in their area i.e. "Oosteleke Transvaal Kooporasie" (OTK). Progress Milling in Polokwane has currently launched the promotion of indigenous crops which offers farmers incentives such as the type of crops (drought resistant seeds) to be cultivated and fertilizers to be used, support in terms of transportation to the mill by bringing the market closer to the people. Such market ventures should be explored and the best market utilized for the benefit of the farmers.

(iii) The farmers should explore the market so that their produce will give them good returns and they should aim to produce for local and global markets i.e. exporting their produce beyond Sekhukhune district.

(iv) The farmers should introduce indigenous vegetables to the local market in an aggressive way.

4.4.2 To the extension workers at the ground (municipal level)

Below are some recommendations to the extension workers at the ground:

(i) It is suggested that attention be given to farmer participatory experiments i.e. on how they gather, produce, process and utilize indigenous foods.

This will sustain their farming systems and ownership of the means of production.

(ii) Extension workers should have a paradigm shift by taking their programmes to the youth i.e. youth days, youth farmers, competitions which involve the youth, making partnership with local schools in issues related to agriculture to attract the youth into agriculture, more especially farming.

(iii) Although majority of the farmers are subsistence farmers, extension workers should try to assist them to produce crops for both subsistence and commercial purposes. They should also address the farmers' marketing problems.

(iv) Extension workers should explore the current markets prior to planting so that they will be a source of information on where to sell the crops produced by the farmers within their area. They should be proactive in sales and marketing thus filling that vacuum which very often frustrate the small holder farmers. If the right market is explored, extension should use mass media to announce it so that all the farmers can use that market.

(v) Farmers` days and agricultural shows should be held in Sekhukhune district where farmers, schools and the community will be given an opportunity to view indigenous crops both cultivated and wild. Women should be encouraged to exhibit different food preservations and fresh food prepared for the show i.e. millet porridge served with "morogo wa mphodi". Extension workers should liaise with the private sector to get prices for the best produce in each category displayed for the occasion. Such incentives will motivate the farmers to compete creating more challenges for the years to come. This process is likely to influence and reinforce the decision of the farmers to produce more indigenous crops.

(vi) Radio programmes should include programmes which promote the efforts of farmers where the advantages of producing indigenous crops are presented and the benefit thereof. These programmes should be made more relevant and be easily understood by the farmers preferably in the local language (Northern Sotho) taking into cognisance the low level of education in the research area.

(vii) Farmers should be allowed to incorporate their indigenous knowledge systems into any innovations brought by the extensioners. The extensioners should also learn the indigenous ways of production so that they will be in a better position to complement the two rather than blaming the other in instances where crops fail. To avoid crop failure the extensioners should learn from the farmers and help them to promote core aspects of indigenous knowledge which can lead to advancement i.e. intercropping sorghum, cowpea and pumpkins. The advantage is that the family will have crops and vegetables while the shades of the pumpkins protect the soil moisture.

(viii) Extension workers should set their extension goal with the farmers rather than for the farmers. Participatory methods are needed especially on the adoption rate at different dates. The extension workers should evaluate their programmes and be prepared to adjust them in areas where they seem to be ineffective.

(ix) Extension should be guided by policies, acts and procedures as laid down by the central and provincial government. There is a need for all extension workers to study the policies so that their programmes could align with the current policies, and they should communicate these policies to the farmers at the ground.

5.4.3 To the provincial and national government

(i) Government should form partnership with the private sector to develop technology that can ease the processing tasks performed by women. That technology should also be affordable as most households are poor. Since women play a pivotal role in household food security, attempts should be made to increase their production and processing skills through the use of appropriate technology.

(ii) The government and other role players in development should be able to create frameworks and facilitating conditions that will allow small holder farmers the majority of which are women, to begin to produce indigenous crops to meet their household needs in a sustainable manner. Policy frameworks for the production of all indigenous crops should be in place so that the extension workers can have firm guidelines to refer to.

(iii) The government (Department of Agriculture Limpopo province) should address irrigation problems especially in communities closer to the Olifants river (in villages such as Phetwane, Krokodill, Mphane, Wonderboom, Stykrall B and Tswaing etc.), as a mater of urgency so that the farmers could return to their fields which they abandoned since 1998.

(iv) Indigenous concepts such as “letšema” should be incorporated into the current policy framework to encourage the farmers to use their indigenous co-operative measures. While the adoption of the new technology is envisaged, if it is implemented within the “letšema” concept, the programme will be more sustainable.

(v) Policies designed at national level should be made available to the ground as a matter of urgency to allow the extension workers to align their programmes with new developments of the said policies i.e. biodiversity act; indigenous knowledge systems policy, integrated food security policy

to mention just a few. Such policy documents will help the extension worker at the ground to be part of the implementers of the coutry`s policies.

(vi) One of the millennium goals is to decrease poverty by 2015. Governments are looking for sustainable ways of decreasing poverty. One of the strategies could be the promotion of indigenous crops and to encourage communities to resort to these crops. Their advantages are that they resist drought while the current communities indicated that they do consume them. Therefore, if indigenous crops and vegetables are promoted within the rural sector, poverty could be eliminated while the surpluses will be utilized to buy other products available on the market.

(vii) National policies should play a major role in controlling the prices of indigenous crops. Pricing policies must reflect the value of maintaining these stocks of crops within the rural areas.

(viii) In the dawn of genetically modified seeds, rural communities should be assisted in developing gene banks where they can store their indigenous seeds with the aim of protecting and promoting them for future generations. In the dawn of globalization, government policies should promote and protect the rights of indigenous communities and their crops. Care should be taken to come up with incentives for production while being facilitated to compete with other stakeholders.

(ix) Indigenous vegetables are valued especially by women. There is a need for further research which could help in quantifying and analysing indigenous vegetables so that the indigenous vegetables can be brought into the main stream of products for sales and marketing i.e. as products sold in local shops.

(x) There is a need for synchronisations of policies from the national, provincial and to the local extension workers.

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APPENDICES

Appendix 1

INTERVIEW SCHEDULE (PHASE 1)

INDIGENOUS KNOWLEDGE SYSTEMS IN THE FIELD OF FOOD GATHERING AND PRODUCTION OF SELECTED RURAL COMMUNITIES IN SEKHUKHUNE DISTRICT LIMPOPO PROVINCE

QUESTIONNAIRE TO BE COMPLETED BY **EXTENSION WORKERS**

DATE: 30 JUNE 2004

This questionnaire will be anonymous and confidential.

A. GENERAL INFORMATION

1.1 Name ……..
1.2 Region ……
1.3 Place/ Municipality ……
1.4 Date ……

B: INDIGENOUS FOOD GATHERING

1. Which indigenous food systems are common in your district? (fruits, vegetables, roots & tubers, insects, fish, wild animals and other resources such as firewood, water etc)

……
……
……
……

2. Who is involved in indigenous food gathering activities in your area?

……
……
……
……
……

3. Where do they gather the food?

……

C. INDIGENOUS FOOD PRODUCTION, PROCESSING, PRESERVATION, STORAGE AND UTILIZATION

3. Which indigenous food crops are still cultivated in your area? Categorize them in terms of priorities.

……
……
……
……

4. Who cultivates them?

……
……

5. How do they cultivate them?

……
……
……

6. Which indigenous food production methods and tools are used in your communities? Use the table below for your answer.

Indigenous food production methods	**Tools used**

7. What post harvest activities are there in your communities?

……
……
……

8. List and describe indigenous food processing, preservation and storage methods and tools which are still used in your communities. Use the table below for your answer.

Indigenous food processing methods	Indigenous food preservation methods	Indigenous food storage methods	Tools used

9. Which problems do the communities face during storage of their produce?

……
……
……

10. How do they utilize the indigenous food?

……
……

11. List indigenous livestock which are commonly found in your communities.

……
……

12. How does the indigenous livestock contribute to the people's livelihoods?

……
……

14. Describe the food utilization and consumption patterns by the communities in cases of food surpluses.

……
……

15. Which indigenous foods can contribute to household food security?

……
……

D: INSTITUTIONAL AND POLICY ISSUES

Whether the answer is yes or no, participants should give reasons

16. Do you have an extension policy? (The researcher should request to see a copy of that policy)

Yes ……..
No …….

16.1 If yes, what is the link between you extension policy and the promotion/ non-promotion of indigenous knowledge system in agricultural production activities (production & gathering)

……
……

17. Which policies are easy to implement in your department?

……
……

18. The participants should identify **institutional and policy constraints** on the gathering, acquisition and production of indigenous food in Sekhukhune district.

……
……

19. Does the government provide you with any household food security policy? (copy required)

Yes ……..
No ……..

19.1 If yes, what is its impact on the use of indigenous food systems?

……
……

20. Are there policies on indigenous knowledge or traditional knowledge in agricultural practices?

Yes ……..
No……..

21. Do you know anything about the Integrated Food Security Policy document for South Africa?

Yes …….
No …….

21.1 If yes, what is its linkage towards the promotion of indigenous knowledge system (IKS) in food gathering and production to ensure household food security?

……
……
……

22. How can you translate the policy into the district or village level?

……
……
……

23. Who formulates your operational policies?

……
……

24. Identify the contribution/s, which indigenous knowledge food systems could make to household food security despite the current policy constraints if any.

……
……

25. Do you, as extension personnel feel strong about IKS and its role?

……
……

26. What is the link between extension services and IKS, and how do we go about strengthening that linkage?

……
……

27. How is your linkage between research and farmers/ communities?

……
……

THANK YOU FOR YOUR COOPERATION!

INTERVIEW SCHEDULE (PHASE 2)

THEME: INDIGENOUS KNOWLEDGE SYSTEMS IN THE FIELD OF FOOD GATHERING AND PRODUCTION OF SELECTED RURAL COMMUNITIES IN SEKHUKHUNE DISTRICT LIMPOPO PROVINCE

Rules: the researcher should ensure confidentiality and anonymity.
Request: Supply the correct information to the following questions.

Interview schedule No. …… Date ……..

Name of Village/ location ……Municipality……..

A. DEMOGRAPHIC INFORMATION OF THE PARTICIPANT

1. Name of the participant …….

2. Position in the household

☐ Mother

☐ Father

☐ Grandparent

☐ Child

☐ Any household relative

3. Total numbers of household members ……

4. Sex: Male ….. Female ……

5. Age at last birthday

- ☐ Below 20 years
- ☐ 20- 29 years
- ☐ 30-39 years
- ☐ 40-49 years
- ☐ 50-59 years
- ☐ Above 60 years

6. Educational levels

- ☐ No formal schooling
- ☐ Primary education
- ☐ Secondary education
- ☐ High school education
- ☐ Tertiary education diploma
- ☐ Tertiary education degree and above

7. Employment status

☐ Working full time

☐ Working part time

☐ Casual/ piece jobs

☐ Unemployed

☐ Housewife taking care of the home

☐ Pensioner

☐ Student

8. Occupation (livelihood activities)

☐ Full time farmer

☐ Part time farmer

☐ Part time farmer and by indigenous food gathering

☐ Part time farmer by remittance

☐ Other ……

9. If you are a part-time farmer how often do you visit you farming area for farming purposes?

☐ Seasonal

☐ Monthly

☐ Weekly

10. If you depend on remittances for your livelihood, what is your monthly remittance?

☐ Below R200.00

☐ Between R200.00 to R700.00

☐ Between R700.00 to R1000.00

☐ Above R1000.00

☐ Other ……

11. How long have you been staying in this area? ……. (years)

B. INDIGENOUS FOOD GATHERING, HUNTING AND UTILIZATION INFORMATION

Livelihood of the people in the past

12. What were the main indigenous food gathering activities of your parents and your grand parents (use the index 1=parents. 2=grandparents)

Hunting animals	
Gathering insects	
Gathering wild fruits	
Gathering wild vegetables	
Gathering wild tubers and roots	
Fishing	

13. Which types of wild animals were used as food by your grand parents in this area?

……
……

14. Which types of insects were used as food by your grand parents in this area?

……
……

15. Which types of wild fruits were used as food by your grand parents in this area?

……
……

16. Which types of wild vegetables were used as food by your grand parents in this area?

……
……

17. Which types of wild roots and tubers were used as food by your grand parents in this area?

……
……

18. Which types of fish were used as food by your grand parents in this area?

……
……
……

Livelihood of the current communities

19. Which indigenous wild foods can you gather in this area?

Vegetables

Name them in order of priority …… ……
……
……

Fruits

Name them in order of priority

……

……

……

20. Do you eat indigenous wild foods? (Food preferences)

☐ Yes

☐ No

21. If yes how often? (Frequency of consumption)

☐ Daily

☐ Weekly

☐ Monthly

☐ Seasonally

22. If no, give reasons why you don't eat them?

……

……

23. Which of these wild fruits and vegetables can you use for income generating purposes? (List in order of priority)

……

24. Do you eat indigenous wild animals? (Food preferences)

☐ Yes

☐ No

25. If yes how often? (Frequency of consumption)

☐ Daily

☐ Weekly

☐ Monthly

☐ Seasonally

☐ Not very often

26. Which indigenous wild animals can you hunt/ fish or collect in this area?

☐ Wild animals (name) ……

☐ Birds (name) ……..

☐ Fish (name) ……..

☐ Insects (name) ……..

☐ Worms (name) ……..

☐ None

27. Describe how you would go about **processing, storing and utilizing** indigenous wild foods

Name/wild food	Processing method	Storage/preservation methods	Utilization

28. Which other wild resources can you collect in the area, which can contribute to your livelihood? (Water, firewood, thatch for brooms, houses or floor mats etc.)

WILD RESOURCE	FUNCTION

29. Explain any obstacles and problems which you encounter in the collection and utilization of wild resources in your area.

……

……

C. INDIGENOUS FARMING ACTIVITIES (PRODUCTION, PROCESSING, PRESERVATION AND STORAGE METHODS) AND THEIR UTILIZATION

Land issues

30. Do you have access to arable land?

- ☐ Yes
- ☐ No (if your answer is no, go to section D, start from question 58: page 14)

31. Who own the land?

- ☐ Head of household
- ☐ Grand parents
- ☐ Other members of the household
- ☐ Lease from the government
- ☐ Lease from neighbours
- ☐ Other (specify)…….

32. Categorize the size of the land available to the household for indigenous field crop production

- ☐ Less than 1 hectare
- ☐ More than 1ha but less than 2ha
- ☐ More than 2ha but less than 3ha
- ☐ More than 3 ha
- ☐ Other (specify) ……

33. Specify the size of land cultivated for indigenous crops the last two years (2004 & 2005)

Type of crop	Size of land in hectares	Partially all of it	Half or more of the land	Less than half of the land	None/No cultivation

34. What is the reason for not cultivating all the land in the last two years?

- ☐ Lack of money to hire tractors or animal traction
- ☐ Lack of resources i.e. seeds, fertilizers
- ☐ No manpower due to illness
- ☐ No manpower due to migration
- ☐ Poor rainfall and draught
- ☐ Other (specify) ……

Current indigenous crop production activities

35. Who is responsible for farming (i.e. planting and taking care of the crops)

- ☐ No farming activity in my home
- ☐ Father
- ☐ Mother
- ☐ Grand parents
- ☐ Son
- ☐ Daughter
- ☐ Hired workers
- ☐ Other (specify)…….

36. Which indigenous crops do your family usually produce (list them according to their importance/ the level of production)

Crop	Position	Hectares	Average No. of Bags

37. What is the main source of irrigation in your area?

- ☐ Dam
- ☐ River
- ☐ Borehole
- ☐ Rainfall
- ☐ Other (specify)……..

38. If irrigation is from the river or dam, how do you bring it to the field?

- ☐ Electric pump and pipe system
- ☐ Furrows
- ☐ Bucket system
- ☐ Other (specify)……..

39. Indicate where you get seeds for planting

Type of seeds	**Co-operatives**	**Local shops**	**Buying from the neighbour's**	**Previous harvest from kin/ household production**
Maize				
Sorghum				
Millet				
Sorghum vulgare/ sweet reed				
Cowpea				
Bambarra nut/ njugo bean				
Mung bean				
Peanuts				
Pumpkin				
Water melon				
Citron				
Gourds				
Peanuts				
White small beans				

40. How do you plant your indigenous field crops?

- ☐ Single stands
- ☐ Mixed cropping
- ☐ Other (specify)……

41. If mixed cropping is practiced, what does the mixture comprise of?

- ☐ Cereals and legumes (specify)……
- ☐ Cereals, legumes, vegetables and fruit vegetables (specify)……
- ☐ Different types of cereals (specify)……
- ☐ Other (specify) ……

42. Do you practice crop rotation in your cropping system?

- ☐ No
- ☐ Yes

43. If yes, briefly describe your crop rotation system or crop sequence

……
……

44. Did you use any fertilizers in your field during the last two seasons? (2004 & 2005)

☐ No

☐ Yes

45. If yes, indicate the type of fertilizer, which was used

Types of seeds	**Chemical fertilizer**	**Kraal manure**	**Compost**	**Green manure**	**Other**
Maize					
Sorghum					
Sweet reed					
Millet					
Cowpea					
Bambarra nut/ njugo bean					
Mung bean					
Peanuts					
White small beans					
Pumpkin					
Water melon					
Citron					
Gourds					
Other					

46. What other chemicals were used/ applied in the field?

Crops	**Herbicides**	**Fungicides**	**Pesticides**	**Other- specify**
Grains				
Beans & legumes				
Vegetables				
Fruit vegetables				
Other				

47. Do you plant indigenous foods crops every year?

☐ Yes

(Why do you plant them) ……

☐ No

(Why not) ……

48. If you sell part of the harvest where do you sell it?

☐ Co-operative

☐ Fresh produce markets

☐ Hawkers

☐ Neighbours

☐ Sell during payday for pensioners

☐ Other

49. What has been your production over the last two years? (2004-2005)

Type of crop	Year/ 2003-2004	Total No. of bags produced	Total No. of bags consumed	Total No. of bags bartered	Total No. of bags sold at local market	Total No. of bags sold at the co-operatives	Total No. of bags stored until the following year

50. Categorize you crop produced in terms of surplus received within the past two years (2004-2005)

Type of crop	Total surplus received: 2004	Total surplus received: 2005

51. What do you do with the surplus of your produce?

Type of crop	Keep some for planting	For consumption and planting	For feeding fowls	For battering	For feeding other livestock at home	For brewing local beer	Others i.e. used as food parcels

52. If you sell part of the harvest where do you sell it?

- ☐ Co-operative
- ☐ Fresh produce markets
- ☐ Hawkers
- ☐ Neighbours
- ☐ Sell during payday for pensioners
- ☐ Other (specify)……

53. How much income do you usually receive from the sale of your produce?

Type of crop	Below R500.00	R500.00 - R1000.00	R1000.00- R2000.00	R2000.00- R3000.00	R3000.00 R4000-00	Above R5000.00

54. Arrange in order of severity the marketing problems/ difficulties you face in the sale of your produce.

……
……..

55. What can be done (if any) to minimise these marketing problems/ difficulties.

……
……

56. Are you interested in trying crops that you never planted in your field to improve your food basket?

☐ No

☐ Yes

57. If yes, indicate the types of crops you would like to have (in order of priority)

Type of crop	Grains	Vegetables	Legumes/ beans	Fruits
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

D: FOOD STORAGE AND PRESERVATION

58. Which indigenous storage structures do you use and for which foods/ crops? (i.e. sešego, tank, jute sac, clay pots, thatched round mud house etc)

Type of foods/ crops	Storage structure	Reason for using it

59. Which indigenous chemical do you use before crop storage? (i.e. aloe ash, name the type of crop and chemical used).

Indigenous chemical	Type of crop	Reason for using it

60. Describe the indigenous storage chemical under the following

ITEM	DESCRIPTION
How the indigenous chemical is prepared before use?	
Administration / how is it used?	
What quantity is used to be effective e.g. per 80kg sorghum/ beans	
At what period of the day do you mix the indigenous chemical with the beans?	
For how long can you store the grains protected with indigenous chemicals?	
Can the gains applied with these chemicals be healthy for human consumption?	
Any other special quality that needs to be described	

61. Describe how you would use your indigenous knowledge and methods to preserve foods (i.e. vegetables, fruits, grains, beans and meat etc)

TYPE OF FOOD	INDIGENOUS PRESERVATION METHODS	DESCRIPTION

E. FOOD PROCESSING

62. To what extent do you approve the following post-harvesting practices, which can be used to process indigenous food crops.

RESPONSES OF PARTICIPANTS

Processing methods	Highly Agree	Agree	Neutral	Disagree	Highly Disagree	Reason(s)/ methods
	1	2	3	4	5	
Drying/ sun						
Threshing using indigenous tools/ threshing stick						
Threshing using heavy machines						
Winnowing using a woven basket						
Mixing seeds with aloe ashes						
Grinding seeds/ grinding stone						
Cooking and sun drying						
Soaking, germination, drying and grinding						
Fermentation						

63. Describe any methods you normally use in processing indigenous crops

……

……

64. Name any indigenous tools, which you use in food processing

……

……..

F: FOOD UTILIZATION AND CONSUMPTION PATTERNS

65. Which of the following indigenous foods do you consume?

FREQUENCY OF CONSUMPTION AND FOOD PREFERENCES

TYPE OF INDIGENOUS FOOD PRODUCT	**HIGHLY DESIRABLE** 1	**MODERATLY DESIRABLE** 2	**LESS DESIRABLE** 3	**NONE** 4	**REASONS**
Sorghum					
Sorghum beer					
Sweet reed					
Millet					
Cowpeas					
Bambarra nut/ njugo bean					
Mung bean					
Peanuts					
Pumpkin					
Water melon					
Citron					
Gourds					
Pumpkin leaves					
Water melon leaves					
Cowpeas leaves					
Gourds leaves					
Tshima					
Ting					
Dikgobe					

G: DECISION MAKING PROCESS (HOUSEHOLD DECISION POWERS)

66. Who takes farming decisions in your family?

Father	
Mother	
Grandfather/ mother	
Son/ daughter	
Other (specify)	

67. Who takes marketing decision in your family? (What to sell and for how much)

Father	
Mother	
Grandfather/ mother	
Son/ daughter	
Other (specify)	

68. If the produce (cattle, bags of sorghum etc) is sold, who takes decisions of what to do with the earnings?

Father	
Mother	
Grandfather/ mother	
Son/ daughter	
Other (specify)	

69. Who takes food utilization decisions in your family? (i.e. meal sharing decisions)

Father	
Mother	
Grandfather/ mother	
Son/ daughter	
Other (specify)	

70. Which indigenous foods do you think they can contribute to household food security?

NAME OF FOOD	REASONS WHY IT IS REGARDED AS A FOOD THAT CONTRIBUTE TO HOUSEHOLD FOOD SECURITY

H: INSTITUTIONAL AND POLICY ISSUES

71. Are you legally allowed to hunt, gather and collect indigenous foods and firewood in this area?

☐ Yes

☐ No

72. If no, what do you do to meet these basic needs for your survival?

☐ Poaching

☐ Asking a permit to hunt/ collect

☐ Both

☐ None

73. Do you know if there is any policy to govern the hunting, gathering and collection of indigenous resources?

☐ No

☐ Yes

74. If yes, what does the policy say, and who should ensure that the policy is adhered to?

……
……

75. Do you have the services of extension workers in your area?

☐ Yes

☐ No

If yes, which food production information do you require to increase your production or to ensure your livelihood security?

☐ Indigenous food gathering, processing and utilization

☐ Indigenous crop production

☐ Indigenous food processing

☐ Indigenous food storage

☐ Indigenous food utilization, preparation and serving

76. Does the extension service in your area promote the use of indigenous knowledge system (i.e. in food production, processing, storage, utilization of indigenous crops)?

☐ Yes

☐ No

If yes, how do they promote it?

……
……

If no, what ought to be done to promote it?

……
……

77. Is it necessary for us to promote indigenous knowledge in the field of food gathering and production in this region?

☐ Yes

☐ No

If yes, what is it that you as a farmer would like to know more in the field of food gathering, production, processing, storage and utilization?

……
……

78. Which indigenous food crops do you wish could form part of the current extension projects?

……
……

79. Do you know anything about the extension policy on farming in South Africa?

☐ Yes

☐ No

If yes, how does it link extension services and subsistence farmer` s indigenous knowledge system?

……
……

80. Do you know anything about the Integrated Food Security strategy (policy) of South Africa?

☐ Yes

☐ No

If yes, what is its linkage to wards you livelihood security, or how important is it form you as an ordinary household member/ small-scale farmer?

……
……

THANK YOU FOR YOUR COOPERATION!

Figure1. Gathering fire wood (Mmakgatle village)

Figure 2: Vendors selling Cleome (leroto) in Groblersdal taxi rank

Figure 4: The researcher during the data collection phase: Ga Rahlagane village

Figure 5: A focus group of women farmers (Mogorwane village)

Figure 6: Marula beer processing (Ga Rahlagane village)

Figure 7: Focus group of farmers (Mphane village)

Figure 8: Gathering indigenous vegetables (morogo) (Phetwane village)

Figure 9: Citron (lerotse) (citron leaves are used as relish)

Figure 10: Indigenous water melon (Legapu; leaves are used as a relish)

Figure 11: Cowpea (Monawa; leaves used as relish)

Figure 12: Pumpkin (Lefodi; leaves used as a relish)

Figure 13: Calabash (Mokgopu; leaves used as relish)

Figure 14: Food processing (Drying morogo)

Figure 15: Selling gourds (Maraka) on the road side

Figure 16: Vegetable processing (drying pumpkin and watermelon leaves)

Figure 17: Processing white small beans

Figure 18: Winnowing beans using a winnowing basket (Mogaladi village)

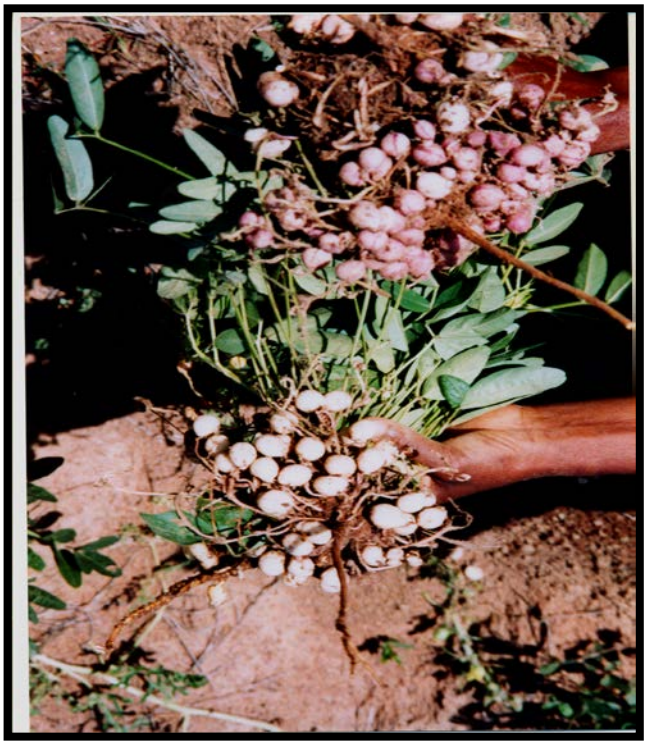

Figure 19: Bambarra ground nuts (Ditloo-Marapo)

Figure 20: Sweet reeds (dintsho) sold at the road side