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**TITLE: THE ROLE OF INDIGENOUS KNOWLEDGE IN AGRICULTURE AND
ENVIRONMENTAL CONSERVATION: THE CASE OF GUTU DISTRICT,
ZIMBABWE.**

By

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**SUBMITTED IN FULFILMENT OF THE REQUIREMENTS OF THE
DEGREE OF DOCTOR OF PHILOSOPHY IN THE FACULTY OF SOCIAL
SCIENCE AND HUMANITIES, DEPARTMENT OF LIBRARY AND
INFORMATION SCIENCE, UNIVERSITY OF FORT HARE**

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SUBMITTED: JANUARY 2014

DECLARATION

I declare that this document is a product of my own work and, has not been submitted for a degree at any university. I know that plagiarism is wrong; hence I acknowledge all the sources consulted, including all those who offered me assistance.

ACKNOWLEDGEMENTS

The success of this research was as a result of contributions by different individuals and organizations. First, my heartfelt gratitude goes to Professor E.M. Ondari-Okemwa for providing me with intellectual guidance, constructive criticism and suggestions which helped in shaping up the work. I would also like to thank the Govan Mbeki Research and Development Centre (GMRDC) for their financial support in form of a supervisor-linked bursary. The funds from the bursary assisted with my upkeep, hence was able to work with minimum challenges. I deeply appreciate the intellectual advice given by Professor Patrick Ngulube, words of encouragement from Doctor Peterson Dewah, and a mutual friend Remigios Mangizvo, with whom I shared views about my research.

I would like to thank the Gutu District Administrator's office and the traditional leaders who facilitated my easy access to the Gutu communities for data gathering. The same gratitude goes to the Gutu district agricultural and extension services department for giving me permission to interview their officers dotted around Gutu district. I am particularly indebted to the Gutu District Assistant Administrator, Netsai Mushauri for providing me with useful information concerning the settlement demarcations and statistical data for the district. The University of Fort Hare Library staff is also thanked for their timely provision of research materials.

To my wife, Ruth, I say thank you for shouldering the responsibilities of the home while I spent most of the family time away in South Africa. Even to my children, Sharon and Tinotenda, I thank them for being able to endure the absence of their father for the duration of the studies. To my brother, Tarusenga Wutete, I thank you for patiently

assisting me through the rigorous data collection exercise. It was a tiresome exercise involving extensive travelling and jotting down of notes during interview sessions. All my other family members, I thank you for your moral support and prayers.

ABSTRACT

Indigenous Knowledge (IK) is an emerging area of study that focuses on a community's ways of knowing, seeing and thinking, developed over a long period of time. The knowledge is passed down orally from one generation to the other. Therefore, this study highlights a number of important factors that are associated with the use of IK in rural communities such as Gutu district. The major importance of IK include the following: it reduces costs through the use of locally available resources, acts as the basis of local-level decision making, is familiar and acceptable to the communities in which the knowledge exists and also that IK helps communities to develop their own sources of livelihoods. The objectives of the study were; to identify the types of IK peculiar to agriculture practices and the conservation of the environment within Gutu district; establish the challenges confronting IK utilization in communities; identify the constraints affecting the sharing, transfer and preservation of IK; determine the measures which should be adopted in order to promote the appreciation and value placed on IK in agriculture practices and the conservation of the environment; and to propose recommendations on how IK should be utilized for sustainable livelihoods in agriculture and environmental conservation in Gutu district and other rural communities.

The study employed the survey method which was premised on the use of multiple data gathering tools, also referred to as triangulation. A total of 100 interviewees were sampled from Gutu communities for face-to-face interviews, 48 participants for focus group discussions, with each group comprising of 6 participants. The researcher collected data using a set of interview guide questions for individual participants as well

as for the focus group discussions. In order to be comprehensive in data collection, the researcher also utilized observations and transects walks (these are random walks done in an area under study in order to have a better understanding of activities of the area).

The triangulation of data gathering tools assisted with diverse information on the crops cultivated by residents, cultivation methods, harvesting and the preservation of the crops. The researcher also gathered information on how residents interacted with the environment, established reasons which contributed to the deterioration of the environment, established the sacredness associated with certain areas in Gutu district and the use of taboos as a way to safeguarding natural resources. The traditional practices have become a thing of the past to the present generations.

The research had four major findings: First, it was found out that Indigenous Knowledge which was the basis of traditional lifestyles is no longer a major practice by Gutu residents. The gradual decline of traditional indigenous practices contributed among other factors to the decline in agriculture output. Residents have abandoned traditional farming methods such as conservation farming. The latter practice kept the soil intact and rich in fertility unlike the use of ploughs and tractors which weakens the soil. More so, residents have opted for the cultivation of crops which do not give them good harvests. Maize is one such crop which suffers from droughts as opposed to small grain crops, comprising of finger millet, pearl millet and sorghum. These endure dry conditions with limited rainfall. Gutu residents also revealed that there is overlooking of the sacredness associated with certain areas and the use of taboos to conserve the environment. It was further established that while residents have knowledge of sacred places and prohibitive taboos which are meant to safeguard the environment, residents

no longer respect the prohibitions due to the influence of modernity and Christianity which regard some of the practices as backward or wayward beliefs.

Second, the study established that the influence of colonial policies influenced a number of changes to the continued utilization of Indigenous Knowledge in agriculture and the management of the environment. For example, Gutu residents no longer practice shifting cultivation which used to be practice in the 1920s backwards. Residents are now confined to small pieces of land which are continuously cultivated on a yearly basis. Therefore, soils have become exhausted and production has gone down since the majority of residents are not able to replenish the soil through the use of fertilizer whose cost they cannot afford. It was also established that the environment has deteriorated continuously due to over use by an ever-increasing population.

Third, the study found out that traditional platforms such as the *dare* (men's meeting place) are no longer in existence. The *dare* is a set-up in which males sit around a fire place and shared ideas on different subject areas as a way of teaching one another life lessons and grooming the future generations. On the other hand, women use the round hut in which food is prepared to address a number of teachings to the girl child. Elderly women took the opportunity to induct young girls into adulthood along the duties expected of women in the society. Nowadays, both males and females share the hut used for preparing food and this is disrupting the traditional set-up of inducting young males and females in separate and appropriate platforms. The situation was worsened by colonialism which came along with Christian teachings, part of which were not in tandem with traditional indigenous practices. For example, the sacredness

of places and the use of taboos are regarded by the youths as old and outdated beliefs with no relevance in today's modern world. To make matter worse, there is limited contact time between the youths and the elders due to work commitments in urban areas. This has limited the opportunities for the sharing, transfer and preservation of IK as opposed to the traditional times in which shared communal lives allowed constant interactions and appreciation of indigenous ways of life.

Fourth, there are no tangible strategies for the preservation of IK for posterity. While general information on traditional IK can be shared by residents, there are individuals who possess rare knowledge but made it their preserve after they realized that the knowledge offered them competitive advantages and benefits. Another aspect is that the youths have lost interest in IK of the past since they feel that the knowledge has lost relevance to their present interests due to the dynamism of culture. In the youths' views, IK which is useful and relevant to their generation will continue to exist while practices which are no longer useful will fall by the way side.

The research utilized interviews in order to establish the manner in which Indigenous Knowledge is acquired, shared, transferred and even retained for use by future generations. The findings of the study formed the basis for recommendations, of which if adopted, could contribute significantly to the revival of indigenous knowledge practices in Gutu district. The use of indigenous knowledge, peculiar to people in a given locality, can contribute to the promotion of sustainable livelihoods and development of rural communities in Gutu district.

Based on the findings of the study, the following recommendations can be considered:

there is need for the establishment of Indigenous Knowledge Resource Centres (IKRCs) in communities so that individuals with interest in traditional IK can acquire the knowledge free of charge. It may also be beneficial if IK can be introduced to become part of the tertiary level curricula. Since Zimbabwe is an agro-based economy and also the fact that rural communities rely on the environment for provisions such as firewood, production and conservation measures being part of the curricula. This will assist decision makers to appreciate and value IK in decision making and development projects, not only in agriculture and the conservation of the environment, but also in other sectors that promote people's livelihood.

DEDICATION

To my late parents, Torai Obert Wutete and Ratidzai Wutete.

LIST OF ABBREVIATIONS AND ACRONYMS

CCDP- Chinyika Community Development Project

EMA- Environmental Management Agency

IK- Indigenous Knowledge

IKIRCs- Indigenous Knowledge Information Resource Centres

IKSs- Indigenous Knowledge Systems

IPR- Intellectual Property Rights

TABLE OF CONTENTS

DECLARATION	i
ACKNOWLEDGEMENTS	ii
ABSTRACT	iv
DEDICATION	ix
LIST OF ABBREVIATIONS AND ACRONYMS	x
LIST OF TABLES	xviii
LIST OF FIGURES.....	xix
1 INTRODUCTION AND BACKGROUND TO THE STUDY	1
1.1 Introduction and Conceptual Background of the Study	1
1.2 Knowledge	5
1.2.1 Types of knowledge	5
1.2.1.1 Tacit knowledge	6
1.2.1.2 Explicit knowledge	7
1.3 Indigenous knowledge	8
1.4 Colonialism and Indigenous Knowledge systems	9
1.4.1 Threats to indigenous knowledge	11
1.4.2 Characteristics of indigenous knowledge.....	12
1.4.3 Importance of indigenous knowledge.....	13
1.5 Indigenous traditional knowledge (ITK)	14
1.6 What are indigenous knowledge systems?	15
1.6.1 Traditional Cropping Patterns	16
1.7 Statement of the Problem	17
1.8 Aim and Objectives of the Study	19
1.9 Research Questions.....	19
1.10 Justification of the study	20
1.11 Scope and Limitations of the Study.....	21

1.12	Significance of the Study.....	22
1.13	Dissemination of research findings	23
1.14	Chapter Demarcations	24
1.15	Chapter Summary	25
2	THEORETICAL FRAMEWORK.....	27
2.1	Introduction	27
2.2	A theory.....	28
2.2.1	Importance of a theory	28
2.2.2	The Social Cultural Learning Theory.....	29
2.2.3	The Postcolonial Theory	32
2.2.4	The Knowledge Conversion Theory.....	34
2.2.4.1	Socialization.....	36
2.2.4.2	Externalization	37
2.2.4.3	Combination.....	38
2.2.4.4	Internalization	38
2.3	The Ba Model.....	39
2.3.1	Originating ba (Face-to-face individual)	40
2.3.2	Dialoguing ba (Face-to-face collective).....	40
2.3.3	Systematizing ba (Virtual collective)	40
2.3.4	Exercising ba (Virtual individual).....	41
2.4	Traits of Indigenous knowledge.....	42
2.5	Summary.....	43
3	REVIEWING OF RELATED LITERATURE	44
3.1	Introduction	44
3.2	What is Knowledge?	45
3.2.1	Types of knowledge	46
3.2.2	Exploring Tacit knowledge	46
3.2.3	Exploring Explicit knowledge	50
3.3	Knowledge Management	52
3.4	Indigenous Knowledge	56
3.4.1	Oral tradition and indigenous knowledge systems.....	61
3.5	Indigenous traditional agriculture	62

3.5.1	Rotational farming.....	63
3.5.2	Sustainable Agriculture: The Samoa lessons.....	64
3.5.3	Intercropping.....	66
3.5.4	Benefits of intercropping	67
3.5.5	Conservation Farming.....	69
3.5.6	Benefits of Conservation agriculture	70
3.6	Traditional crops.....	72
3.7	Indigenous knowledge and Gutu District.....	74
3.8	Transfer of indigenous knowledge	77
3.8.1	Use of taboos.....	78
3.8.1.1	Environmental thrust of taboos	79
3.8.1.2	Taboos Protecting Water Sources	80
3.8.1.3	Taboos protecting the natural vegetation and wildlife	81
3.8.1.4	Taboos protecting endangered nonhuman animal species.....	84
3.8.1.5	Taboos of the Rukwa nature (Fencing property using charm)	85
3.8.2	Proverbs	87
3.8.3	Riddles.....	88
3.8.4	Songs.....	89
3.8.5	Rituals.....	90
3.8.6	Community laws	91
3.8.7	Dances.....	93
3.9	Importance of indigenous knowledge.....	94
3.10	Intellectual Property law and Indigenous Knowledge	94
3.11	Sharing of Indigenous Knowledge	97
3.12	Traditional Knowledge and ICTs.....	100
3.12.1	Colonialism	101
3.12.2	Urbanisation.....	102
3.12.3	Globalization	103
3.13	Government measures to save the environment.....	103
3.13.1	Environmental Management Agency (EMA)	104
3.13.2	National Tree Planting Day	105
3.14	Indigenous Knowledge Retention Strategies	106
3.14.1	Indigenous knowledge Resource Centres	106
3.14.2	Development Partners	107
3.14.3	Community Empowerment.....	108
3.14.4	Benefit Driven Approach	110
3.14.5	Customary law	110
3.15	Summary.....	111

4	RESEARCH DESIGN AND METHODOLOGY	113
4.1	Introduction	113
4.2	The background of Gutu district	114
4.3	Study methodology	116
4.4	Qualitative Research Methods	119
4.5	Triangulation	120
4.6	Surveys	121
4.7	Research Design.....	122
4.8	Study Population	125
4.9	Study Sample	126
4.10	Data Collection Instruments	129
4.10.1	Interviews.....	130
4.10.2	Interview Guide	132
4.10.3	Focus Group discussions.....	135
4.10.4	Observation	138
4.10.5	Transect Walks	140
4.11	Data Collection Techniques	142
4.12	Pilot study and Instrument Validation	146
4.13	Reliability and Validity in Research	148
4.14	Response Rate	149
4.15	Challenges in the field	149
4.16	Data processing	150
4.17	Ethical Considerations	151
4.18	Chapter Summary	155
5	DATA PRESENTATION, ANALYSIS AND INTERPRETATION	156
5.1	Introduction	156
5.2	Participants' profile.....	157
5.2.1	Gender and Age	158
5.2.2	Participants' duration of stay in their areas	160

5.2.3	Social status of participants	161
5.2.4	Participants' levels of education.....	163
5.3	Indigenous Knowledge for agriculture and environmental conservation	164
5.3.1	Indigenous practices in Gutu Communities	165
5.4	Themes and indigenous knowledge assessment.....	167
5.4.1	Theme one: Indigenous knowledge awareness	169
5.4.1.1	People's views of Indigenous Knowledge	169
5.4.1.2	Local knowledge	170
5.4.1.3	Rural people'/farmer's knowledge.....	171
5.4.1.4	Traditional ecological knowledge	171
5.4.1.5	Indigenous knowledge peculiar to agriculture	173
5.4.1.6	Indigenous knowledge and the environment.....	178
5.4.1.7	Challenges to indigenous knowledge practices	180
5.5	Theme two: Sharing of Indigenous Traditional Knowledge	184
5.5.1	Sharing of Indigenous knowledge	184
5.5.2	Benefits of indigenous knowledge to communities	188
5.5.3	Challenges in the sharing of indigenous knowledge	189
5.6	Indigenous Knowledge Transfer.....	191
5.6.1	Mechanisms for the transferring of indigenous knowledge	192
5.6.2	Benefits of indigenous knowledge transfer	195
5.6.3	Indigenous Knowledge Documentation and Preservation.....	196
5.6.4	Retention of Indigenous knowledge	
5.6.5	Indigenous knowledge and education.....	198
5.6.6	Indigenous Knowledge and Intellectual Property Rights	199
5.6.7	Propping up of indigenous knowledge: whose responsibility?	200
5.7	Focus group discussions: Indigenous knowledge in weather forecasting	202
5.7.1	Birds associated with weather forecasting	202
5.7.2	Animals associated with the prediction of the weather	204
5.7.3	Insects and creatures observed in weather forecasting	205
5.7.4	Celestial bodies as weather forecast indicators	206
5.7.5	Winds and atmospheric appearances as weather indicators	208
5.7.6	Vegetation as weather forecast indicators	209
5.7.7	Transect walks	211
5.7.8	Observations.....	212
5.7.8.1	Land preparation.....	213
5.7.8.2	Animal rearing.....	213
5.7.8.3	Vegetation.....	214
5.7.8.4	Water sources.....	215
5.7.8.5	Land utilisation.....	215

5.8	Summary.....	216
6	FINDINGS, CONCLUSIONS AND RECOMMENDATIONS.....	218
6.1	Introduction	218
6.2	Interviewees' Profiles	219
6.3	Sources of Indigenous knowledge awareness	221
6.4	Indigenous knowledge and agriculture	222
6.4.1	Cultivation of small grain crops	223
6.4.2	Management of soil fertility	225
6.4.3	Preservation of seeds	227
6.4.4	Control of pests and diseases.....	227
6.5	Animal rearing	228
6.6	Indigenous weather forecasting	228
6.7	Indigenous knowledge and environmental conservation	229
6.7.1	Sacred water sources	230
6.7.2	Environmental taboos and sacred practices	231
6.7.3	Overpopulation and environmental degradation	232
6.8	Challenges to indigenous knowledge practices	232
6.8.1	Western education and Christianity	233
6.8.2	Modernity	234
6.8.3	Urbanization.....	234
6.8.4	Disintegration of cluster communal homesteads	235
6.9	Sharing and transfer of Indigenous knowledge	236
6.9.1	Benefits of sharing and transfer of indigenous knowledge	239
6.9.2	Challenges of sharing and transfer of indigenous knowledge	240
6.9.3	Western influence and youths perceptions	240
6.9.4	Christianity	241
6.9.5	Secrecy of indigenous knowledge	242
6.9.6	Preservation of indigenous knowledge	243
6.9.7	Benefits of IK sharing and transfer	244
6.10	Documentation of IK for posterity	245
6.10.1	IK and education	246
6.10.2	Intellectual Property Rights and IK.....	246
6.10.3	The responsibility of upholding IK	248
6.11	Summary.....	249
6.11.1	Summary of chapters.....	249

6.11.2	Summary of findings	251
6.12	Theories of indigenous knowledge	256
6.12.1	The Sociocultural Theory	256
6.12.2	The Postcolonial Theory	257
6.12.3	The Knowledge Conversion Theory	259
6.13	Conclusions.....	260
6.14	Recommendations	266
6.15	Areas for further study.....	269
6.16	Chapter Summary	271
6.17	Final conclusion	272
REFERENCES.....		274
APPENDICES		297

LIST OF TABLES

Table 3-1: Key stakeholders in promoting IKSs utilization.....	108
Table 4-1: Summary of research questions, data gathering methods and justification of methods.....	117
Table 4-2: Sample of the study population.....	127
Table 4-3: Objectives, research questions and possible sources of data.....	146
Table 5-1: Interviewees' Profiles	160
Table 5-2: Platforms for transferring IK	193
Table 5-3: Promoters of IK in communities	201
Table 5-4: Birds associated with weather forecasting	203
Table 5-5: Animals and weather prediction	205
Table 5-6: Insects/creatures and weather prediction.....	206
Table 5-7: Weather forecast indicators based on wind and atmospheric appearances	207
Table 5-8: Vegetation indicators and weather forecasting.....	210

LIST OF FIGURES

Figure 5-1: Interviewees' Levels of education	163
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CHAPTER ONE

1 INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction and Conceptual Background of the Study

This study focuses on the role that indigenous knowledge (IK) can contribute in terms of agriculture and environmental conservation in Gutu district. The district has faced perpetual challenges of droughts over the years and as such, it generated interest in the researcher to try and establish whether the use of IK can help in alleviating food shortages, mainly caused by incessant droughts. Apart from the shortages of food, Gutu district is gradually drifting towards desertification due to ongoing deforestation, siltation of rivers and dams as well as limited pastures for grazing animals. There are studies which have been carried out in some parts of Gutu district, to assess the role of IK in agriculture. Muchineripi, (2008) conducted a study which helped in the setting up of the Chinyika communal development project (CCDP) which assessed the viability of small grain crops, particularly finger millet in alleviating food shortages in the Chinyika communal areas in the northern part of Gutu district. Another study was done by Oxfam, (2007) which assessed the use of conservation farming in different parts of Gutu district. The studies revealed that conservation farming can help to alleviate food shortages in the drought prone areas of the district. The farming method suits areas with limited rainfall because of the use of planting basins which conserves moisture, as well as mulching and the application of locally available resources, such as cow dung manure.

Apart from the mentioned studies, the researcher was also motivated by Tatira, (2010) who looked at the influence of (*zviera*) taboos as a way of safeguarding nature. Basing on some of the mentioned works, the researcher found it worthy his time to further explore the role of IK in promoting sustainable livelihoods in the areas of agricultural production and the conservation of the environment. The paragraphs that follow focuses on the description of Gutu district as the case study. The information will assist readers to have detailed insight of the area under study in order to have a better appreciation of the study focus.

Gutu district is situated in Masvingo province, which is in the southern part of Zimbabwe. The district falls into five distinct settlement demarcations namely; the old resettlement, newly resettled, small scale farmers, communal and urban areas, covering a total of 369 744 hectares of land (Agriculture, Technical and Extension Services Department, Gutu, 2011). Gutu district has a total population of 213 263, with an annual growth rate of 1.01 percent (Zimbabwe Statistics Office, 2002). The Agriculture, Technical and Extension Services also provided information which explains that Gutu district is generally dry, with conditions ranging from arid to semi-arid. In terms of climatic regions, the district falls into natural regions 3, 4, and 5, characterized by a rainfall pattern which ranges from normal, average to below average milliliters per annum respectively. Areas under natural region 3 receive normal rains, enough for productive agriculture, while regions 4 and 5 comprising the greater part of the district, experience spats of droughts, resulting in hunger and poverty due to general food shortages (Agriculture, Technical and Extension Services Department, Gutu, 2011).

Gutu district Agriculture, Technical and Extension Services Department further highlighted that rainfall patterns determine the different types of crops grown throughout the district. For instance, in region 3, comprising of (old and new resettlements), residents grow the maize crop mainly due to the fact that they receive normal rains. However, regions 4 and 5 (comprising of small scale and communal farmers) the area is suitable for drought resistant crops such as sorghum, finger millet and pearl- millet. As Muchineripi (2010) observed, the residents of Gutu prefer to grow maize in spite of the fact that the crop fails most of the seasons due to drought. The reason for sticking to the failing maize crop is due to the fact that maize has increasingly become the staple food for Gutu residents as opposed to small grain crops. More so, maize does not have intensive labour in terms of preparation for food when compared to the small grain crops. The same regions 4 and 5 are basically for subsistence farming, supported by livestock rearing in the form of cattle, sheep, goats and chicken, among other domesticated animals. Residents engage in other community practices such as gardening, which is carried out during the winter period after the completion of crop harvesting. The plants grown include vegetables such as cabbages, tomatoes, peas, beans, carrots, among other varieties (Agriculture, Technical and Extension Services Department, Gutu, 2011).

Gutu communities rely on the environment for basic provisions such as firewood which they use for cooking and warming houses. Trees are cut down to secure poles for the fencing of homesteads, construction of cattle pens and the construction of granaries, among other homestead uses. The environment provides herbs to traditional healers and midwives. It is the same environment which offers grazing areas to livestock throughout

the year. Another factor negatively impacting the situation is the increasingly growing population in Gutu district which stood at 213 236 in 2011, calculated at an annual growth rate of 1.01 percent since 2002 (Zimbabwe Statistical office, 2002).

The challenges which Gutu residents are facing can best be addressed by solutions from within the communities themselves (home-grown solutions). One scholar came up with suggested measures which rural communities can adapt to overcome poverty. Odora-Hoppers (2002:5), thus remarked that:

...where it is identified that particular communities are... economically poor, concerted research and development interventions grounded in an indigenous knowledge system perspective should help the situation at community level, and offer advice...

What can be derived from Odora-Hoppers' sentiments is that Indigenous Knowledge and indigenous practices have a role to play in local level development projects for communities through the use of locally available resources. It is important to first understand what Indigenous Knowledge is all about. The term 'Indigenous Knowledge' is a description of the knowledge systems developed by a community as opposed to scientific knowledge that is generally referred to as 'modern' knowledge (Ajibade, 2003). Apart from the latter explanation of IK, Mapara (2009: 140) also looks at Indigenous Knowledge as a body of knowledge, or bodies of knowledge, of the local people of particular geographical areas that they have survived on for a very long time. When the definitions are linked to agriculture, Indigenous Knowledge peculiar to agriculture should focus on the means with which local people of a given area like Gutu, prepare their land, the types of crops they cultivate; cultivation methods, harvesting and the storage of the crops. When Indigenous Knowledge is applied to the conservation of the

environment, focus is mainly on environmental ethics, the use of taboos, customary laws, beliefs and values which regulates the use of natural resources in the environment (Chisenga, 2002). Measures of conserving the environment were practiced in the traditional times and were passed on from one generation to the other through oral traditions (Vansina, 1985).

In this study, there it is necessary to understand what knowledge as a discipline entails so as to be able to explore Indigenous Knowledge operations in community livelihoods.

1.2 Knowledge

What is knowledge? Definitions of the term “knowledge” range from practical to the conceptual and to philosophical, and have a narrow and broad scope. In Liebowitz (1999), knowledge is defined as the whole set of insights, experiences and procedures that are considered correct and true and therefore guide the thoughts, behaviours and communications of people. Nonaka and Takeuchi (1995) view knowledge as true and justified belief. Others like Davenport and Prusak (1998) define knowledge as a fluid mix of experiences, values, contextual information and intuition that provides a structure to evaluate and incorporate new experiences and information. Yet, Ward (1998) says that knowledge is an accumulation of (facts and information) and knowing how (the ability to do something).

1.2.1 Types of knowledge

The knowledge management discipline recognizes two types of knowledge, which may be managed as any other valuable economic resource, namely explicit and tacit

knowledge (Nonaka and Takeuchi 1995). Explicit knowledge has distinct characteristics explained by Nonaka and Takeuchi (1995), these explain knowledge as a resource that can easily be shared, is documented, is transferrable and is retainable. On the other hand, tacit knowledge is referred to as informal knowledge or personal knowledge, rooted in individual experiences and involves personal beliefs, perspectives and values (Polanyi, 1966).

There are differences between tacit and explicit knowledge with tacit knowledge being what people carry in their minds and the knowledge is difficult to access, while on the other hand, explicit knowledge is what is documented or codified and can be easily transferred to others (Das, 2007).

1.2.1.1 Tacit knowledge

Polanyi (1958) explains tacit knowledge as personal knowledge bound to human beings. As such, Indigenous Knowledge falls into the category of tacit knowledge since the knowledge is 'personal knowledge' which resides in people's minds and hearts. Similarly, Irick (2007) explains that tacit knowledge is knowledge that resides in an individual's mind, and is either internal or interior knowledge, peculiar at personal level. The knowledge manifest itself in a community culture, and as such, it is difficult to share with people outside another culture. Since tacit knowledge is a preserve of individuals, Polanyi (1966) refers to the knowledge as "knowing more than we can tell".

This means that the knowledge which individuals possess can only be known when efforts are made to acquire the information for posterity. Take for example, knowledge possessed by the elderly people, some of whom are in the twilight of their lives, they might die and depart with their knowledge.

1.2.1.2 Explicit knowledge

Explicit knowledge is usually expressed in handbooks, papers, patents or software (Gronau and Weber, 2004). Explicit knowledge is regarded as formal, codified, systematic, and easy to communicate and share and is usually articulated in writing and numbers (Schmidt *et al.*, 1996).

Some of the sources containing explicit knowledge within Gutu communities comprise of pamphlets, booklets, charts and books. The latter sources, captured by Oxfam, a Non-Governmental organization, comprise of recorded interviews of community members who explain about their agricultural practices and environmental regeneration. The sources contain agricultural information on land preparation, types of crops grown and a calendar of conservation agriculture followed during the year. For example, it is explained that conservation farming promotes minimum soil disturbance since seeds are sowed in the prepared planting basins, soil is covered with grass mulch to retain moisture, crops are mixed and rotated in order to fight pests and diseases, the crops include maize, sorghum, cotton and sunflowers (Breton & Kwazira, 2012). Some of the pamphlets and booklets contain information about the dos and don'ts in managing the environment in order to foster conservation measures. The key issues articulated, include environmental renewal measures through annual activities such as tree planting. The information recorded by NGOs help communal people to be more productive in agriculture by adopting the conservation farming methods as well as rejuvenation of the environment through tree planting. The planting of trees is an individual choice for community members and usually they plant gum trees. There are benefits for individuals who plant gum tree plantations, since trees help in meeting household needs such as the provision

of poles and firewood without further destruction of the vegetation.

1.3 Indigenous knowledge

Indigenous knowledge (IK), is knowledge that local people in a given area or community have developed over time and which they continue to develop (Warren, 1991 and Scoones and Thompson 1994). This means that indigenous knowledge is dynamic and is not only confined to the original inhabitants of one area, but rather, is knowledge which is locally developed and continue to grow (Warren, 1992; IIRR, 1996; Grenier, 1998 & Langill, 1999 ;). Grenier further clarifies that indigenous knowledge: “is...the unique traditional knowledge existing within and developed around specific conditions of women and men indigenous to a particular geographic area” (Grenier 1998:1). What makes the knowledge indigenous is its inalienable link to the native people of a particular locality. Indigenous knowledge can be structured knowledge which is systematic, with gender and age-specific training taking place, and is stored in people’s memories and activities. Indigenous knowledge can be expressed in the form of stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local language and taxonomy, agricultural practices, equipment, materials, plant species and animal breeds. Indigenous knowledge is usually shared and communicated orally using specific examples, and through cultural practices. Indigenous knowledge take different forms of communication and organization, and that is vital to local level decision-making processes, its preservation, development and the manner it spreads in communities (Grenier 1998:2).

Flavier *et al.* (1995: 479) reiterated what other scholars have expressed about IK that it

is the information base for a society and that it influences decision-making. Indigenous Knowledge, therefore, is dynamic, and is continually influenced by the internal creativity and experimentation as well as through contact with external systems. In terms of importance, indigenous knowledge has an essential role of promoting sustainable livelihoods within a community where it is understood and practiced. The knowledge usually manifest itself through skills, experiences and insights of people, such that when the knowledge is applied, it helps to maintain or improve local people's livelihood, World Bank (1997). From the explained nature of IK, communities in Gutu district can likewise derive benefits from IK practices which are useful in agriculture and the conservation of the environment. For example, the adoption of conservation agriculture relies on the use of locally available resources such as cattle manure and rotten tree leaves, while the environment can be rejuvenated through the planting of indigenous trees.

1.4 Colonialism and Indigenous Knowledge systems

The coming of colonial rule in Africa and particularly the rapid advancement of scientific knowledge in the last fifty years brought about significant changes in societies, including Gutu communities. While indigenous knowledge continued to exist within people's way of life in the past, the adoption of the Western culture influenced a number of changes to the lifestyles of the local communities. Nzewi (2007) hinted on what should be taken as advice to indigenous communities when he expressed that:

Contemporary Africans must strive to rescue, resuscitate, and advance our original intellectual legacy or the onslaught of externally manipulated forces of mental and cultural dissociation now rampaging Africa will obliterate our original intellect and lore of life.

While the dangers of mental and cultural dissociation are real, there is need for indigenous knowledge not to be overshadowed by western influences, but instead to complement one another for the improvement sustainable livelihoods in rural communities. The sentiments are supported by the assertion given by (Warren *et al.* 1989), which stated that:

The problems of rural development are no longer seen to reside in the 'traditional' cultures of under-developed people, but rather in the partial and biased understandings...of a western scientific rationality...that has exacerbated rather than reduced inequalities. Indeed, 'traditional cultures' are now seen as containing the bases for any effective development.

From the quotation, one can deduce that an understanding of one's surroundings and the life styles of community members has a bearing on development trends in a given area. It is from such a standpoint, that the shaping of lifestyles in communities begins. This can apply to a wide array of community activities such as agricultural land preparation, food production, environmental conservation, among other activities (Centre for Indigenous Knowledge systems, 2005: 1). Yet another view on the role of IK was expressed by Gata (1993), who puts emphasis on the importance of traditional knowledge in agricultural development in Africa. As Gata (1993) lobbies for the incorporation of indigenous knowledge into development policies and projects, she enthuses that:

Indigenous agricultural practices reflect the store of experience and knowledge accumulated literally over thousands of years based on sound understanding of soils, plants, and the environment. This knowledge is revealed through various practices that are used in crop

production, for example, forecasting seasonality, conservation of crop/plant diversity, mixed cropping, land fallowing, and other associated with soil and crop management systems...generated by sophisticated knowledge.

What is evident from the above statement is that the scientific validity of traditional knowledge in agriculture is that the knowledge helps farmers to predict the onset of rains. Farmers in rural areas usually rely on using environmental signs such as changes in leaf colour of some tree species, shifts in wind direction, cloud formation, temperature and relative humidity fluctuations, as well as bird and beetle songs and their seasonal migration. The signs help in decision-making relating to land preparation, planting methods and choice of plants among other factors.

1.4.1 Threats to Indigenous Knowledge

Indigenous Knowledge possessed by the elders in the Zimbabwean communities remains predominantly unrecorded and much of it has been lost owing to the deaths of those who possess the knowledge. A number of reasons have been attributed to the unfortunate loss of Indigenous Knowledge. The latter knowledge is derived from Traditional Knowledge (TK) and as such, it explains the similarities on dangers affecting Traditional Knowledge and Indigenous Knowledge. Some of the dangers are presented by (Thakadu, 1998: 3) as follows:

- Being oral in nature, Indigenous Knowledge could not be committed to print quickly enough for its survival after the death of those who possessed the knowledge.

- Owing to western influence, local people quickly abandoned their traditional beliefs, customs and values enshrined in taboos, ways of agricultural practice, food eaten and not eaten and even medicines used.
- The coming of Christian missionaries affected a number of traditional African practices, particularly the herbal knowledge. Those who possessed the skills often feared to practice them openly, especially if they were members of a church, the practices would easily attract church disciplinary measures, such as excommunication.
- Introduction of new technologies in the form of ploughs, tractors, and modern hoes and axes, not only saw the increase in usage of the technologies, but also had detrimental effects to the soil and the environment

1.4.2 Characteristics of indigenous knowledge

Since IK is peculiar to people who reside in given geographical set ups, the knowledge derives different terms which are meant to explain lifestyles of people with the same origins. Thakadu (1998:3) uses terms such as: “traditional”, “local”, “community” and “rural people’s knowledge”, interchangeably with IK. In this study, my use of the term IK will be focusing on the traditional knowledge which some Gutu communities may still be following or have slightly changed to suit their time. The knowledge is local, and is the sum total of knowledge and skills possessed by people belonging to a particular geographical area, which enables them to benefit from their natural environment. The knowledge and skills are shared over generations, and each new generation adds and adapts in response to changing circumstances and environmental conditions.

Similarly, (Ellen and Harris, 2000: 2-6), explain IK as knowledge collectively held by a population within a given community. The knowledge is no one person, authority or social group know it all. Indigenous Knowledge thus covers agriculture, health care, community development, natural resources management and other activities of any particular community.

1.4.3 Importance of indigenous knowledge

The World Bank President, James D. Wolfensohn, highlighted the importance of IK during his addressing of delegates at the World Bank launch for Indigenous Knowledge for Development Program (IKDK) in 1998. Wolfensohn remarked that, “Indigenous Knowledge is an integral part of the culture and history of a local community. We need to learn from local communities to enrich the development process” (Gorjestani, 2000:1). Indigenous Knowledge is an asset which is controlled by even the poor rural residents. Other than the free control of IK, individuals in a given area have familiarity with local practices, and this offers the residents natural learning and adaptation, leading to the empowerment of the local communities. In Zimbabwe for example, IK has a number of important roles offered in promoting food security. The use of conservation farming for example, help Zimbabweans to reap good harvests on small portions of land, even those with poor soils, just because the farming method, focuses on the use of concentrated cattle manure and rotten tree leaves in the planting basins (Mushonga 2011). On the other hand, IK help Zimbabweans to achieve food security in that different areas across the country can focus on crops which are suitable for their respective areas.

Studies done in Gutu district have proved that areas which are generally dry due to low amounts of rainfall will do well if residents grow small grain crops such as finger millet and sorghum as opposed to maize which requires a lot of rainfall (Chazovachii, et.al., 2012). The other Indigenous Knowledge practice which Zimbabwean farmers can adopt is that of intercropping which is also known as mixed cropping, whereby, people grow different crops on one portion of land. This practice is done elsewhere across the African continent, in West Africa, where farmers in Ghana grew cowpeas, millet, sorghum and yams as mixed crops Lewicki, (1974). The other type of intercropping is called row intercropping whereby two or more crops are grown simultaneously in a row Dokora (1996). These cultivation methods help to promote food security in that when one crop fails the other one may be harvested, thus providing food to communities. Some farmers in Gutu district and many other parts of Zimbabwe practice intercropping and this has helped in alleviating food shortages.

1.5 Indigenous Traditional Knowledge (ITK)

The term Indigenous Knowledge covers a wide range of topics hence IK is characterized by the use of different terminologies. One of the terms used is indigenous technical knowledge (ITK). Mettrick, (1993: XXII), describes ITK as: "...knowledge of the local people about their environment and the technical aspect of their farming situation, including a capacity to expand that knowledge through observation and experimentation". Therefore, the knowledge is accepted as part of indigenous knowledge and has proved useful to agricultural development. For example, some local farmers within sub-Saharan Africa have developed local means of improving soil structure, water-holding capacity, nutrient availability, water availability and pest control. The measures

are adopted without use of artificial inputs such as chemical fertilizers, pesticides and herbicides (Reijntjes, *et al.* 1993). Local farmers usually resort to indigenous traditional farming methods, such as crop rotation and intercropping for improved harvests (Hart 2005).

Yet another idea supporting the role played by Indigenous Knowledge is the importance of respecting a balanced ecosystem. One good example from the Canadian indigenous peoples, involving a researcher who participated in the berry picking with women from the village revealed the importance of balancing the ecosystem.

The women, as they took the researcher over the hill, said: “You know, you are not allowed to take the berries home”. The remark appeared to have taboo connotations, yet on further inquiry realized that if the berries were moved out of the community, it would affect the little animals that eat them. If the small animals are affected, the big animals feeding on them also suffer and this creates a chain reaction which ends up spilling into communities where people reside (Davis and Ebbe 1993).

1.6 What are Indigenous Knowledge Systems?

Indigenous Knowledge Systems (IKSs) are a collection of societal systems represented by the totality of products, skills, technologies, processes and systems developed and adapted by cohesive traditional societies (Odora-Hoppers, 2002:8). While Indigenous Knowledge is part and parcel of a community's way of life, it should be appreciated that the knowledge undergoes changes. The changes are influenced by developments which take place in the society and where the status quo is maintained, it means that the IK practices are still relevant and useful to people in the concerned area.

An Indigenous Knowledge System is embedded in the cultural web and history of a people, including their civilization. It forms the backbone of the social, economic, scientific and technological identity of a people. An Indigenous Knowledge system consists of a total system of knowledge that encompasses soil and plant taxonomy, cultural (identity, history and language) and genetic information, animal husbandry, medicine and pharmacology, ecology, education, religion and philosophy, climatology, zoology, music, arts, architecture, judicial, political and many others (Hountondji 1997). From the aforesaid, it is realized that IKSs have their roots in people's history and culture, hence being identified from the context of their practices. The practices consist of tangible and intangible aspects within the broader context of a people's lives. For example, from IKSs, one can derive new clues and directions on the visions of a society, prevailing human relations, poverty reduction as well as scientific and sustainable development. Hence in this study, the researcher intends to establish how residents are utilizing indigenous knowledge in agriculture as well as in managing the environment. This research looks at the type of crops grown traditionally, how they were grown and why. If the same crops, such as finger millet, pearl millet and sorghum grown in traditional times are maintained by communities, it means that they are still useful to the people's food needs.

1.6.1 Traditional Cropping Patterns

Food sustainability in traditional times was determined by the cultivation of trusted crops in terms of assuring good harvests even if there were limited rains during that season. The reliance on small grain crops as part of IK of an area still has some relevance in terms of improving farming activities undertaken by rural communities like

Gutu. Traditional farming methods and the crops grown offered a number of advantages. Dokora, as cited by (Normann, Snyman, Chen, 1996), explains that traditional farming procedures thrived on multiple cropping, which provided two or more crops on the same field in a year. Multiple cropping meant mixing different types of crops on a piece of land in one season. There was also the relay cropping whereby a second crop is planted after the first has reached its reproductive stage of growth but prior to maturity. Other farming practices in traditional times include rotational farming whereby crops succeeded one another, for example maize coming after groundnuts. The other farming method was the repetitive cultivation whereby one type of crop was grown in succession to the other (Dokora, 1996: 110-112).

From the farming methods highlighted by Dokora, it is interesting to explore whether rural communities like Gutu district are still utilizing the same farming methods or not in their food production. Since the methods are associated with a number of advantages which can be utilized by rural communities to alleviate food shortages where they have been abandoned, revival strategies can still be mooted in order to promote food sufficiency.

1.7 Statement of the Problem

The problem to be explored in this study is to find out whether Indigenous Knowledge in Gutu district can still be relied upon in order to improve food security as well as reviving the depleted environment. Over the years, the people of Gutu have endured food shortages and near starvation due to incessant droughts. Government and the donor community have been intervening with food handouts for distribution to the residents. The parts of the district which are severely stricken by the perennial drought conditions

are regions 4 and 5 whose annual rainfall is between 400- 600ml. The majority of residents prefer to grow maize though the crop is hard hit by limited rains. Although small grain crops such as finger millet, pearl millet and sorghum are grown, residents prefer to use them for the brewing of traditional beer and where they consume the crops as food, it is on a limited scale. Maize is the staple food for Zimbabweans and as such, Gutu residents prefer the crop and continue to hope that they might realize good harvests in future. To make matters worse, residents are confined to small pieces of land which they cultivate yearly. The current situation is unlike the yester years whereby residents rotated their farming land, allowing land to remain fallow for a number of years before reverting back when the land had regained fertility. The environments are overstrained, particularly the areas which are set aside for animal grazing and for the residents' other needs such as fire wood and fencing shrubs. In the present scenario, the population has significantly increased, thus leading to the straining of the limited resources.

The prevailing situation is therefore a subject of interest to government, the donor community and even the residents themselves, particularly on the possible solutions that can help address food shortages in the district as well as finding ways to help promote environmental regeneration. A number of questions come into mind and these include: which crops should Gutu residents grow? Which farming methods should residents adopt and why? How should natural resources be safeguarded for posterity? These are some of the challenges that should be addressed by this study.

1.8 Aim and Objectives of the Study

The aim of the study is to establish the roles played by indigenous knowledge in promoting agricultural productivity and environmental conservation in Gutu district. To achieve this, the research was guided by the following research objectives:

- (a) To identify the different types of indigenous knowledge used in agriculture and environmental conservation by Gutu residents.
- (b) To establish the kind of challenges experienced by Gutu communities in utilizing indigenous knowledge for sustainable agriculture and environmental conservation.
- (c) To identify the constraints affecting the sharing and preservation of IK by Gutu residents.
- (d) To propose measures that may be adopted by the Gutu communities in order to make Indigenous Knowledge help to promote agriculture practices and the conservation of the environment.

1.9 Research Questions

The research attempted to answer the following questions:

- (a) Which types of Indigenous Knowledge practices are used by Gutu residents in agriculture and environmental conservation?
- (b) What are the challenges experienced by Gutu residents in utilizing Indigenous Knowledge for the promotion of sustainable agriculture and environmental conservation?
- (c) What are the constraints encountered in the sharing and preservation of

Indigenous Knowledge by Gutu residents?

- (d) What measures can be adopted by Gutu residents in order to make Indigenous Knowledge help promote agriculture and the conservation of the environment?

1.10 Justification of the study

Gutu district is located in Masvingo province, south east of Zimbabwe. In the years ranging from 1984 up to 2012, Gutu district experienced numerous spats of droughts, resulting in severe food shortages. In 2010 out of a population of 213 263, about 38 000 households were food insecure after the agriculture harvest. This represents 18% of Gutu population. In 2012 the figure had increased to 49 690 (23.3%) of the population. (Zimbabwe Vulnerability Assessmnets (ZIMVAC) 2010 and 2012) The food shortage rendered residents to be perennial recipients of government and donor food. The World Food Programme partners (NGOs) have been operating in the district since the year 2000 assisting the drought stricken residents with food handouts. However, harvests used to be sufficient in the traditional time as residents mainly focused on the growing of small grain crops such as finger millet, pearl millet and sorghum with limited maize grown. The environment was also densely populated with vegetation, but today the terrains are exposed with deforestation and overgrazing. Rivers, dams and wetlands have also become dry due to siltation and lack of protection. Some basic resources such as fire wood and poles used in homesteads are now scarce. The several challenges prevailing have contributed to the researcher's eagerness to explore whether Indigenous Knowledge can still contribute to the rejuvenation of the forests and improved production in agriculture. While a study of the whole of Masvingo province would have provided

adequate solutions to the province's perennial food shortages, this was not possible due to a number of factors. These include the huge quantities of data to be collected, especially coming in the form of oral interviews covering seven districts which fall under Masvingo province. More so, there was the problem of time constraint, logistical factors and limited resources from the supervisor's allocated funds.

The researcher was able to conduct adequate interviews and focus group discussions with Gutu residents in spite of the limited time available. This made it impossible to cover the whole province, considering its size and population. A study of Gutu district caters well for Masvingo province in general since the district shares the same climatic conditions, soil types and many other environmental aspects common throughout Masvingo province. Outcomes drawn from the study of Gutu district may provide useful lessons to other districts in the province. For example, Chivi and Mwenezi districts which also suffer from perennial droughts may benefit from conservation farming which has improved harvests in parts of Gutu district (Oxfam, 2010). More so, districts in Masvingo province could also adopt the growing of small grain crops such as sorghum, finger millet and pearl millet as the crops are suitable for drought stricken areas.

1.11 Scope and Limitations of the Study

While Masvingo province has seven districts, the research focused on Gutu district owing to the fact that Gutu is the area where the researcher was born and bred. The researcher benefited from prior knowledge of the residents' culture (customs, beliefs and values). Additionally, the researcher observed over the years, witnessing the

deterioration of the environment and spats of droughts ravaging the district. From that background, the researcher sought to establish whether Indigenous Knowledge can help in averting the challenges.

1.12 Significance of the Study

Indigenous Knowledge is embedded in community practices, institutions, relationships and rituals (Centre for Indigenous Knowledge systems, 2005:1) The origin of the idea for this research was prompted by a number of considerations prevalent in Gutu district communities. First, Gutu district has experienced acute food shortages due to droughts ravaging the district more often. However, this is happening on the background when residents used to have good harvests, enough for sustainable livelihoods. People used to practice traditional farming methods and growing small grain crops such as sorghum, finger millet and pearl millet which adapted very well to the prevailing climatic conditions. The crops provided adequate harvests even when the rains were moderate to below average per annum because they are drought tolerant. This study therefore would attempt to establish the role of Indigenous Knowledge in agriculture and the conservation of the environment. The study is also aimed at coming up with measures that can help in the regeneration of the environment. The study will also try to establish which other factors are contributing to food shortages and the deterioration of the vegetation. In the same vein, there will be focus on the effects of the changes in climate and its effects on the environment. The study can also bring about economic significance to Zimbabwe as a country in that development activities derived and determined by local conditions and resources can bring about home grown solutions to

challenges encountered by communities.

This is opposed to modern development trends crafted along foreign based concepts which may not be applicable to local conditions. The study suggests ways of sharing and transferring of Indigenous Knowledge among community members for the betterment of the residents' lives. The revival of indigenous community practices would help boost food production and environmental conservation for sustainable livelihoods. Communities can also set up centres for communal gatherings. These can act as places where communities can gather in order to afford community elders to educate other community other community members on various indigenous issues. Last though not least, the recommendations made from the findings can be adopted by other communities in Zimbabwe facing similar problems to those prevalent in Gutu district.

1.13 Dissemination of research findings

The researcher intends to make gestures of acknowledging and appreciating the role played by community members who provided valuable information through interviews. To do that, the researcher will specifically hand copies of conclusions drawn and recommendations of the study to community leaders such as headmen and chiefs. The findings may go a long way in assisting the community leadership to teach residents the measures that can adopt for the improvement of agriculture and environmental regeneration. On the other hand, the researcher intends to present the findings at conferences, seminars and workshops as a way of sharing and disseminating the information to various interested participants. The researcher also intends to write a book on the study findings and also to publish journal articles from the findings of the

study.

1.14 Chapter Demarcations

This thesis is divided into seven chapters as briefly outlined below:

Chapter 1: Introduction, background to the study, A brief history of Gutu communal demarcations, definition of terms such as indigenous knowledge, indigenous knowledge systems, indigenous traditional knowledge and knowledge, statement of the problem, aim and objectives of the study, research questions, limitations, delimitations, significance of the study and dissemination of findings .

Chapter 2: The theoretical framework of the study focused on theories that are applicable to Indigenous Knowledge as a discipline. These included the sociocultural learning theory, the Postcolonial theory and the Organizational learning theory. Some important terms and concepts were also defined.

Chapter 3: Literature review under various subheadings derived from the research questions. Pertinent topics such as indigenous knowledge as a discipline, indigenous knowledge practices, Systems were discussed, as well as agricultural methods used by farmers, environmental effects and natural resources conservation methods from an indigenous point of view.

Chapter 4: Research design and Methodology

Discussion focused on a detailed outline of the methodology and activities of the

research, including the target population, sample, research instruments, data collection procedures and ethical considerations.

Chapter 5: Data Presentation, analysis and interpretation, Presentation of findings using tables, figures, description and document analysis

Chapter 6: Summary of the research findings, conclusions and recommendations, and an overall summary of the study. Part of the findings are that the majority of Gutu district residents have minimized the growing of small grain crops such as sorghum, finger millet and pearl millet in preference for the maize crop. The research concluded that while indigenous practices of conservation farming is providing Gutu residents with good harvests, indigenous practices are fast declining, particularly in the conservation of the environment. The use of taboos (avoidance rules), which helped in safeguarding environmental resources, is no longer adhered to, thus exposing natural resources to relentless plundering. Other contributory factors to the decline in agriculture and the environment are due to population increase and climate changes. It is therefore recommended that a balance be stricken between modern day practices in agriculture, (use of fertilizers and mono-cropping) and conservation farming.

1.15 Chapter Summary

Chapter one looked at the background to the research study. It clarified key concepts to the study through explaining terms such as indigenous knowledge, Indigenous Knowledge Systems, and Indigenous Traditional Knowledge, knowledge and types of knowledge management. The research problem, research objectives and research

questions were outlined. The research limitations were stated, and then the significance of the study explained. Finally, an explanation was given on how research findings would be disseminated. The next chapter discussed some theories of knowledge management as they relate to enhancing indigenous knowledge application.

CHAPTER TWO

2 THEORETICAL FRAMEWORK

2.1 Introduction

The theories discussed in this study include: social learning theory, post-colonial theory and organizational knowledge creation theory. Indigenous Knowledge (IK), unlike scientific knowledge is a fairly new discipline in terms of research. Warren (1991) explains IK as local knowledge that is unique to a given culture or society. Warren contrasts IK with the international knowledge system which is generated by universities, research institutions and private firms. The comparison of scientific knowledge and IK show that IK is fairly new in terms of research hence the theories selected for this study are borrowed from other disciplines such as Education and Management. This study is anchored on (Nonaka and Takeuchi, 1995:62)'s socialization, externalization, combination and internationalization (SECI model). The model is known as the knowledge conversion theory which is modeled along the SECI steps and this will be applied to the study of the role of IK in Gutu communities.

The fact that indigenous knowledge is part of an emerging knowledge body calls for an in-depth study of the importance of the knowledge to the society. Nkrumah (2003) regards IK as a rich knowledge base to countries where it is exploited and to the world in general. Indigenous knowledge is local knowledge of any given community and that knowledge can help in providing home grown solutions to problems existing in particular area than out-sourcing solutions. This comes out when Warren (1991: 1) refers to IK as the basis for local-level decision-making in agriculture, health care, food

preparation, education, natural resources management, and a host of other activities in rural communities. This study, apart from the knowledge conversion theory, looks at two other theories mentioned above which can be applied to the management of IK in rural communities such as those of Gutu district.

2.2 A theory

The term theory can be understood in different ways. For instance, the Oxford dictionaries refer to theory as a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained (Oxford Dictionary: online). A theory can also be viewed as an ordered set of assertions about a generic behavior or structure assumed to hold throughout a significantly broad range of specific instances (Sutherland, 1976:9). Yet another definition of a theory regards it as a system of constructs and variables in which the constructs are related to each other by propositions and the variables are related to each other by hypotheses (Bacharach, 1989). Therefore, one can further explain that theories are formulated to explain, predict and understand phenomena, and in many cases to challenge and extend existing knowledge within the limits of the critical bounding assumptions (Torraco, 1997). In the theoretical framework of this investigation, relevant theories are introduced and described in a manner that helps to highlight why the research problem under study exists.

2.2.1 Importance of a theory

Basically, a theoretical framework consists of concepts, together with their definitions and existing theory/theories for the study at hand. The theoretical framework is intended

to strengthen the study in the following ways:

- Allows a critical evaluation of theoretical assumptions
- Connects the researcher to existing knowledge, and with a relevant theory, the researcher has a basis for hypotheses and choice of research methods.
- The how and why questions of the theoretical assumptions of the study are addressed.
- Generalizations are minimized since focus is on key variables, and there is an examination of the differences in variables, as well as the influencing circumstances (Torraco, 1997; Neuman, 2006).

Overall, a good theory helps to explain the meaning, nature and challenges of a phenomenon so that people may use the knowledge and understanding gained to solve problems (Torraco, 1997). Theories give researchers the means with which to tackle complex situations and social issues, they allow the assessment of problems as well as the prescription of possible solutions.

2.2.2 Social Cultural Learning Theory

The Social learning cultural theory, (also written as sociocultural theory) was derived from a Russian psychologist by the name of Lev Vygotsky (1962). The theory stresses on the importance of interaction between people and the culture in which they live. Due to the influence of culture, it is believed that parents, caregivers, peers and culture in general are responsible for the development of an individual's higher order functions. Thus, the Social learning theories help in understanding how people learn in social contexts (learn from each other) and also that it informs the construction of active

learning in communities. Lev Vygotsky (1962) further explains that learning starts through interactions and communications with other individuals. This means that there is influence from the social environment in which people live. As such, Vygotsky reiterated that learning takes place through various forms of interactions, for example when students interact with their peers, teachers, and other experts, learning takes place. Consequently, a teacher creates a learning environment that maximizes the learner's ability to interact with others, and that is through discussion, collaboration, and feedback. Moreover, Vygotsky (1962) further illustrates that culture is the primary determining factor for knowledge construction. Vygotsky posits that individuals learn through cultural lens by interacting with societal members, and they are guided by the rules, skills, and abilities shaped by the culture of that society. Such learning, as Pionke and Browdy (2008) put it, is that, people learn through what begins as an individual's collective ability to experience and interpret the world in a community context. This can be referred to as learning by doing. The social theory of learning thus views the community as a social fabric for learning leading to collective knowledge (Pionke and Browdy, 2008). The Vygotskian theory also looks at relations between individuals and how members of the society shape their culture. Individuals in the society, Vygotsky explains, learn from one another than in isolation. The learning process calls for cooperation among individuals and it is based on authentic situations which allow individuals to reflect on how knowledge is applied to everyday situations.

Another important feature of the Vygotsky theory is scaffolding. Under scaffolding, the theory states that when an adult provides support for a child, they will adjust the amount

of help they give depending on the child's progress. The kind of help given to the child is a step-by-step procedure until the help is completely withdrawn (Vygotsky, 1978:76). This progression of different levels of help is what is called 'scaffolding'. It draws parallels from real scaffolding for buildings which are used as a support for construction of new material (the skill/information to be learnt) and then removed once the building is complete (the skill/information has been learnt).

Yet another view about sociocultural learning theory is one that says learning takes place through observations by the learners during demonstrations by the teacher (Bandura, 1971:3). Through observations, Bandura explained that people learn through watching the behaviour of those around them. The behaviour comes in the form of individual performance, or as an instruction accompanied by vivid details on how certain activities are done, typical of symbolizing behaviour. Therefore, the Social learning theory is premised on continuous reciprocal interaction between cognitive, behavioural, and environmental influences.

While the Vygotskian theory explains that knowledge is acquired by the learners through socialization with knowledgeable members by means such as observations and scaffolding, learners go through step-by-step procedures to acquire the knowledge. However, the same procedures, premised on systematic procedures may not apply to the acquisition of Indigenous Knowledge. Since IK is tacit in nature, it requires the initiative of the one who possess the knowledge in order for those interested in knowing to benefit. Therefore, the Social cultural learning theory works well in the scenario whereby the one possessing IK practices acts as the mentor to the one interested in acquiring the knowledge.

2.2.3 The Postcolonial Theory

The term Postcolonial theory is often said to begin with the works of Edward W. Said, Gayatri Chakravorty Spivak, and Homi K. Bhabha among others. The theory looks at literature and society from two broad angles: that is how the writer, artist, cultural worker, and his or her context reflects a colonial past, and how they survive and carve out a new way of creating and understanding the world (Young 1996; 2001). Edward Said, explaining the post-colonial theory argues that the Europeans divided the world into two parts; the east and the west or the occident and the orient or the civilized and the uncivilized (Edward Said, 1977:52-55). This was totally an artificial boundary; and it was laid on the basis of the concept of them and us or theirs and ours. The Europeans used orientalism to define themselves. Some particular attributes were associated with the orientals, and whatever the Orientals were not, the Occidents were. The Europeans defined themselves as the superior race compared to the orientals; and they justified colonization by this concept. The Europeans said that it was their duty towards the world to civilize the uncivilized world (Edward Said, 1978: 6-12). The main problem, however, arose when the Europeans started generalizing the attributes they associated with orientals, and started portraying these artificial characteristics associated with orientals in their western world through their scientific reports, literary work, and other media sources. The developments created a certain image about the orientals in the European mind and in doing that infused a bias in the European attitude towards the orientals (Malcolm Kerr, 1980: 544-547). Another proponent of the postcolonial theory is Franz Fanon. Fanon (1986), in his book, *Black Skin, White Masks*, he suggests that colonialism, because of its explicit promotion of white racial superiority over non-white

peoples, has created a sense of division and alienation in the self-identity of the colonised. Fanon argues that under colonialism, the history, language, culture, customs as well as belief systems of the white colonizer are to be considered as universal and normative as well as superior to the knowledge systems of the colonized that are treated as the inferior other (Fanon, 2008: 82-86). The proliferation and perpetuation of this myth created a sense of inferiority among the colonized and this forced them to emulate almost all of the colonizers' identity as their own. To make matters worse, the colonized emulated the colonizer's language, culture and customs, thus being alienated from their cultures, with some going to the extent of bleaching their skins so that they resemble the whites (Sadar, in Fanon, 2008: vi-xvi). In order to relinquish the imperial yoke, the colonized first had to fight for political liberation, thereafter; they would reclaim and reconstruct their own history and culture in a postcolonial era.

Post-colonial theory has weaknesses in that it fails to recognize the dynamism of culture. The interactions which happen between the various nationalities of the world or in particular the colonizer and the colonized, transformed societies. For example, the aspect of imitating foreign culture, diluted indigenous practices, be it in agriculture or environmental conservation. Communities should adjust to the current practices and fuse the practices with useful indigenous ways. As an example, conservation farming, which utilizes local resources, can be relied upon together with use of fertilizers for better agricultural yields. Thus, instead of completely condemning colonialism, there should be an effort to bridge the polarization between the colonizer and the once colonized so that either side can take what is good discarding that which may not be good to the other. The same analysis can be applied to the Gutu communities, whereby

indigenous knowledge practices like conservation farming can be used together with modern methods of agriculture. In order to ensure sustainable livelihoods in rural communities, the inherent changes within the communities should not be ignored. Factors like population increase have influenced people to use modern methods of farming whereby farmers apply fertiliser to their crops for improved production rather than rotational farming which allow soil to regain fertility through natural ways. Those who do not afford the cost of fertilizers can use conservation farming which utilizes locally available resources. The challenges posed by deforestation are addressed through the growing of exotic trees (gum tree plantations) to supply with firewood and save on the few remaining indigenous trees.

2.2.4 The Knowledge Conversion Theory

Ichijo Nonaka (2007) is of the view that Knowledge management (KM) approaches are mainly used to support business growth in the developed world. On the other hand, (Mosia and Ngulube 2005) are of the view that instead of KM approaches being restricted to supporting business systems in developed countries, the approaches should be adopted by the developing world to promote local practices for future developments. In the context of Gutu communities, this study adopted the Nonaka model, crafted along the organizational knowledge conversion theory. The theory looks at the interaction between tacit and explicit knowledge within the KM discipline. The theory is premised on the SECI model of Nonaka and its associated “ba” of Nonaka and colleagues. The SECI model has four modes of knowledge creation namely: socialization, externalization, combination and internalization. The knowledge management processes in the community are generated through a spiral manner

whereby knowledge is converted from the knowledge state of individuals and organizations, which is from tacit to explicit and vice versa. In Gutu communities for example, as elderly members, chiefs and headmen among others, interact with residents, knowledge is generated, shared, transferred and retained by recipients during interactions. This is what is called Socialization in Nonaka's SECI model. It involves the sharing of tacit knowledge between individuals through joint activities (such as mentorship programmes and apprenticeships where individuals interact with one another in the same environment) rather than the sharing of knowledge through written instructions.

In order to understand the application of the SECI model to this study, there is need to highlight aspects of it which relates to the KM concepts. For example, KM has been successfully adopted by many organizations which intend to build their competitive advantage and achieve sustainable growth patterns (Nonaka 2007). However, KM practices have been observed to succeed in closed or formal organizations as compared to informal settings since the former have formal structures and rules to which incumbents adhere to (Mosia and Ngulube 2005). In spite of this, KM can also be applied to rural communities of developing countries, such as Zimbabwe, and in Gutu district in particular as the focus of the research. Rural communities have an extensive base of IK which is at the risk of becoming extinct if appropriate measures are not taken to manage IK so that the knowledge contributes to development, (Lwoga and Ngulube 2008). IK can be used to promote agriculture since the knowledge can be tapped from knowledgeable individuals, farmers and traditional practitioners in rural communities. In fact, KM balances interest and power differences and also encourages

knowledge exchange and learning (Bode, 2007). More so, KM also enables the management of the two types of knowledge, which is tacit and explicit knowledge. Tacit knowledge according to (Nonaka 2000), is highly personal, hard to formalize and, therefore difficult to communicate to others. In the words of (Polanyi, 1958), sums up tacit knowledge as, “Knowing more than we can tell”. This means that tacit knowledge has a cognitive dimension, it consists of mental models, beliefs and perspectives so ingrained that we take them for granted, and therefore cannot easily articulate all of the knowledge. Explicit knowledge is formal knowledge expressed in systematic language in the form of data, scientific formulae, specifications and manuals (Nonaka, Toyama, Konno, 2000). Thus explicit knowledge is easily stored and shared by those who need to use it. However, with IK which is tacit in nature and is embedded in practices and experiences, also being highly personal and difficult to codify and diffuse, more practical measures should be adopted like converting it to explicit knowledge.

The distinction between explicit and tacit knowledge makes it necessary that this study adopts the SECI steps of the knowledge creation model (Nonaka Toyama, 2003). The SECI model represents processes of socialization, externalization, combination and internalization in the knowledge creation or spiral web.

2.2.4.1 Socialization

Socialization is also referred to as (tacit to tacit). It is the process where tacit knowledge is shared through shared experiences, between individuals on face to face conversations. Knowledge is passed on through practice, guidance, imitation and observation (Frost, 2010). The interaction process according to (Workineh, Garfield,

Boudreau, 2010) involves the sharing of tacit knowledge between individuals through joint activities (such as mentorship programs, and apprenticeships where the individuals interact with one another in the same environment) rather than the sharing of knowledge via written or verbal instructions. In Gutu communities for example, community members, particularly the elders, knowledgeable individuals, chiefs and headmen among others, share IK through social interactions, and this enables knowledge to be imparted or transferred to other residents. The tacit knowledge transferred to residents, can be retained through converting it to explicit knowledge through published materials, for the benefit future generations. The process is derived from (Nonaka, 1991)'s example of how a Japanese company, Matsushita Electrical Company, devised a home bread-making machine, having learned the technique of “twist dough” method from the Osaka International Hotel’s head baker. The baker’s kneading technique of stretching the dough was successfully copied to make the bread making machine. The machine made remarkable sales because of the good quality of bread it produced. Thus, making personal knowledge available, like what the head baker did, was central to the making of the machine, and the same technique, applies to the knowledge creation company. As for Indigenous Knowledge, there are similarities in that communities create new means of doing certain tasks through improvising in accordance to resources available in a given area.

2.2.4.2 Externalization

Externalization involves tacit knowledge being converted into comprehensible forms that can be understood by others (explicit knowledge). According to (Logwa, Ngulube, 2010), the tacit knowledge is converted to explicit knowledge with the help of metaphors and

analogies, for example, printed materials and rock paintings. During the externalization stage of the knowledge creation process, an individual commits to the group and thus becomes one with the group. The sum of the individual's intentions and ideas combine and become integrated with the group's mental world. In Gutu communities, externalization can be realized from agricultural extension officers who can reproduce indigenous farmers' knowledge into explicit modes through documenting what the farmers say and produce handouts which can then be referred to for information. The same communal farmers can externalize their knowledge by interacting with fellow members through formal or informal groups.

2.2.4.3 Combination

The combination phase, (explicit to explicit) involves the conversion of explicit knowledge into more complex sets of explicit knowledge. In this stage, the key issues are communication and diffusion processes and the systematization of the knowledge (Nonaka and Takeuchi, 1995:67). The new knowledge generated in the externalization stage widely spreads in analogues or digital signals. This may be through the utilization of information and communication technologies (ICTs) and existing databases (Logwa, Ngulube, 2010). For example, rural farmers can use mobile cellphones to share information on farming or they may exchange written information on agriculture practices in order to improve their harvests.

2.2.4.4 Internalization

This is the process where explicit knowledge is transferred to tacit knowledge, for example, learning by doing or translating theory into practice. The internalization of

knowledge is expressed as the “explicit knowledge tacit knowledge” (Nonaka and Takeuchi, 1995). The process involves the conversion of explicit knowledge into tacit knowledge. This requires an individual to identify knowledge which is relevant for oneself within the organization knowledge. The intention is for the individual to find the best way to fit in a larger entity, which is the society itself. The process involves learning by doing, training and exercises, and that allows the individual to access the knowledge realm of the group and the entire organization. The knowledge conversion process results in explicit knowledge becoming tacit. The knowledge becomes useful when it is verbalized or diagrammed into documents, manuals or oral stories (Ichijo, Nonaka, 2007: 285). Documentation helps individuals to internalize what they experience, thus enriching their tacit knowledge. In addition, documents or manuals facilitate the transfer of explicit knowledge to other people, thereby helping them experience the experiences of others indirectly. In Gutu communities for example, farmers with access to televisions and may be routinely watching a programme called *Murimi wanhasi* (today’s farmer), gain invaluable knowledge from agricultural experts who share views on best practices in agriculture. More so, the programme allows viewers to make telephone calls, to make inquiries. This allows farmers to seek clarity on issues presented during the discussion session, thus gaining more knowledge. Acquired knowledge can be shared with other members and farmers may put that into practice, thus acquiring other people’s experiences into their own experiences.

2.3 The Ba Model

Ba is a group context whereby knowledge is shared, generated and put into practice through collaboration. The *ba* concept unifies physical spaces such as office and virtual

space (e.g. e-mail and mental space, including shared ideals, or good social relationships), Logwa, Ngulube, 2010. There are four different notions of *ba* which correspond with the interaction in the SECI process (Nonaka, Toyama and Konno 2000):

2.3.1 Originating *ba* (Face-to-face individual)

It is defined by the individual and face-to-face interactions (individual feelings, emotions, experiences and sharing of mental modes). It is part of the creative context of daily work where tacit knowledge of the job develops, (Nonaka, Toyama and Konno 2000).

2.3.2 Dialoguing *ba* (Face-to-face collective)

This category is defined by collective and face-to-face interactions, where there is the sharing of individual mental modes, anecdotes, stories, recounting daily experiences and other informal transactions and skills. These in turn allow tacit knowledge to spread and influence organizational work.

2.3.3 Systematizing *ba* (Virtual collective)

Collective knowledge leads to the discovery that certain kinds of practices produce better outcomes. As such, management can learn from employees' behaviour in the organization such that it helps them in making informed decisions. That way, it helps in formulating best approaches to execute tasks. What this implies is that knowledge can be generated from the behaviour of the residents in how they react to new knowledge. For example, the manner in which Gutu residents are embracing conservation farming, it shows that they are happy with the outcome observed from

others who have used the farming method before. Therefore, it is like when people evaluate and review the way others do their work, it facilitates the recombination of existing explicit knowledge to form new explicit knowledge (Lwoga, Ngulube 2010).

2.3.4 Exercising *ba* (Virtual individual)

This category is defined by individual and virtual interactions. Information about practices producing better results is compared to individual performance so as to make some necessary adjustments. In the end, individuals will have to modify their behaviour in line with the more successful approach. Thus it is the category in which explicit knowledge is converted into tacit knowledge.

Nonaka and Takeuchi, (1995) also came up with four categories of knowledge assets and these facilitate the knowledge creation processes. Those assets include:

- Routine (i.e. know-how in daily operations).
- Systemic (i.e. codified and systematic knowledge stored in documents, databases, manuals, specifications and patents).
- Conceptual (i.e. knowledge in symbolic form including product concepts, brand equity, designs, methods and language).
- Experiential (i.e. skills and judgment of individuals, pro-social feelings like trust and care).

What can be derived from the above knowledge assets is that knowledge is built from a combination of factors in order for people's development activities to continue growing. This can be further understood in the traits of Indigenous Knowledge.

2.4 Traits of Indigenous Knowledge

The term Indigenous Knowledge can be explained in different ways. From a general point of view, Indigenous Knowledge is the collective knowledge of people who reside in a given geographical area. The knowledge is also referred to using other expressions such as local knowledge, indigenous technical knowledge, 'traditional' knowledge and rural people's knowledge. Sellitoe, (1998) posits that, Indigenous Knowledge is knowledge held collectively by a group of people, informing interpretation of the world. The knowledge is conditioned by tradition, and is culturally relative as well as being inculcated into individuals from birth, and is structured through interaction with the environment (Sillitoe, 1995:204).

With reference to the IK of the Gutu residents, it is important to note that the residents are basically subsistence farmers who earn their livelihood through agriculture. They also rely on the environment for a number of provisions such as firewood, medicinal plants, water, wild food, and grazing lands, among others. The following are some of the characteristics of Indigenous Knowledge:

- Based on local people's experience;
- Often tested centuries of use;
- Adapted to the local culture and environment;
- Dynamic and changing;
- Expressed in local language.

2.5 Summary

The discussion in this chapter was mainly premised on three theories namely Socio-Cultural Learning theory, Postcolonial theory and the Organizational knowledge Conversion theory. Focus was mainly on extracting the linkages in the theory on how it applies to managing tacit knowledge which is the major mode of knowledge among the rural communities of Gutu district. While some of the theories have weaknesses of being inclined to the Western industrialized countries, which are different from the rural environment under study, the theories provide some good inferences in that knowledge possessed by individuals should be explored as part of managing tacit knowledge. The knowledge which is embedded in an individual's mind can never be known until one makes an effort to tape the knowledge through inquiring on what one wants to learn. The acquisition, sharing, and preservation of tacit knowledge is expressed in Nonaka and Takeuchi's SECI model and its associated *ba* categories. Knowledge is shared through interaction of one individual to the other or through group interactions. On the other hand, the Postcolonial theory strives to re-establish the self-identity of the black people through their cultural identity and how people interact in their day to day living. The chapter ended by coming up with definitions of important terms and concepts for the benefit of the readers. The next chapter reviews related literature to the study.

CHAPTER THREE

3 REVIEWING OF RELATED LITERATURE

3.1 Introduction

Focus in this chapter is to review literature which relates to key features of the study. The chapter is structured in such a way that it begins with an outline of knowledge management as a discipline and the two types of knowledge (tacit and explicit knowledge). The discussion goes on to cover issues relating to what indigenous knowledge is, and how it is generated, shared, transferred and preserved in rural communities such as Gutu district. The review further explains the application of Indigenous Knowledge to local agriculture practices. About agriculture, the discussion is premised on land preparation and timing of the rain season, crops grown, cultivation methods, harvesting, and preservation of the harvested food stuffs for future use. More so, discussion is focusing on livestock rearing, particularly looking at the types of animals kept, importance of the animals to residents, state of grazing areas, and animal health. Last though not least, there is discussion on the conservation of the environment, particularly the natural resources. On the environment focus is on the protection of water sources such as wetlands, wells, rivers and dams. The latter have suffered adverse effects due to environmental degradation. Therefore, the importance of conservation practices is explained, bearing in mind the need to strike a balance in the ecosystem.

Thus, by reviewing related literature of the study, it helps the researcher to map and define the research topic, and also to ensure that it is in line with an established body of scholarly literature which is relevant to the study.

In an attempt to establish the importance of IK, the World Bank hosted an international conference which came to be dubbed as the “United Nations International Year of the World’s Indigenous Peoples’ Conference” (Davis & Ebbe, 1993). The conference deliberated on a wide range of issues about the importance of traditional knowledge and culture, land, the environment, traditional medicine and sustainable development among other aspects. Among the issues brought up for discussion was the need to safeguard natural resources for posterity as well as the promotion of sustainable development through agriculture. In both cases, it was agreed that in order to succeed in managing natural resources and to improve agriculture, there was need to go back and learn from cultures that managed to use resources sustainably. Indigenous people across the world have lessons to share in terms of using local knowledge for successful agriculture and the conserving of natural resources. As such, it is important to begin by understanding the basics of knowledge and how it develops to be useful to people daily lives.

3.2 What is Knowledge?

Grey, (1991:3) explains knowledge as the full utilization of knowledge and data, coupled with the potential of people’s skills, competencies, ideas, intuitions, commitments and motivations. On the other hand, Uriarte Jr. (2008) comes up with two interesting definitions of what knowledge is all about. The first one looks at knowledge as familiarity, awareness or understanding gained through experience or study over a long period of time.

The other meaning of knowledge is explained as information that people make use of, along with rules and contexts of its use. From the above explanations of knowledge, one can make an inference to the knowledge possessed by residents of a given area.

The knowledge which residents have about their area gives them a better understanding of their surroundings. The same goes with the use of IK in farming, one leading agriculture expert in Zimbabwe made some interesting insight about the use of IK in agriculture by saying that:

In Zimbabwe, for example, farmers are able to predict the onset of rain using such signs as changes in leaf colour of some tree species, shifts in wind direction, cloud formation, and bird and beetle songs and their seasonal migration (Gata, 1993: 12).

The information in the quotation by Gata shows that residents can rely on the environment, the atmosphere and from birds and creatures to interpret weather patterns and plan for the farming season. Residents of an area adapts to the conditions prevalent in their areas basing on what they experience over the years, gradually becoming part of the people's knowledge of their surroundings.

3.2.1 Types of knowledge

Knowledge, as (Nonaka & Takeuchi, 1991) put it, has two categories, namely; tacit and explicit knowledge. These two types of knowledge shall be discussed below since they have a bearing in this study.

3.2.2 Exploring Tacit knowledge

Polanyi, (1967:4), expresses tacit knowledge as, *"knowing more than we can tell"*. This is because tacit knowledge is stored in the brain of an individual hence it is regarded as personal knowledge. The knowledge is accumulated through study and experience and is developed through the process of interacting with other people. The process of building tacit knowledge is through trial and error. What works well is thus retained as

useful knowledge for future use.

Tacit knowledge is difficult to formalize, record or articulate. The knowledge includes subjective insights, intuitions and conjectures (Uriarte, 2008: 5). Since tacit knowledge is embedded in individuals' minds that makes it unique knowledge held by individuals. Uriarte, (2008), corroborates this by explaining that, since tacit knowledge is highly individualized, the degree and facility by which it can be shared depends on the ability and willingness of the person possessing the knowledge to convey it to others. This becomes one of the challenges associated with the sharing and transfer of Indigenous Knowledge by residents who possess such rare knowledge.

A further analysis of the operations of tacit knowledge in rural communities reveals an interesting dimension on how the knowledge is shared. Tacit knowledge can be shared and communicated through various activities and mechanisms such as conversations, group meetings, on-the-job training and other social forums.

According to the SECI model, which is socialization is one way in which knowledge is exchanged. In explaining the process of socialization, Nonaka, (1996) is of the view that Socialization is a process of creating common tacit knowledge through shared experiences. As an example, there is a case from KwaZulu-Natal, South Africa in which residents devised a method of using the sisal plant for chickens to lay their eggs. This was after realizing that dogs had developed a habit of eating chicken eggs that are laid on the ground in homesteads. Residents developed a strategy of creating nests which ensured the protection of chicken eggs from scavenging dogs. The nests

were constructed from the sisal stem to produce a basket-like nest which was filled with straw and fastened in trees around the homestead. The nesting baskets are accessible to the hens on trees but not to the dogs (Letty & Alcock, 2005:4). That type of knowledge is conveyed to the younger generations through hands-on experience. Thus recipients of the knowledge are socialized into acquiring the skills. Therefore, in socialization, a field of interaction is built where individuals share experiences. What it means is that, tacit knowledge of one person is shared and transmitted to other people for their benefit. Through sharing of individually possessed knowledge, skills are transferred for the benefit of future generations. That case from KwaZulu-Natal in South Africa is a practice is also a common among Gutu residents. What only differentiates the two is the use of locally available resources.

Tacit knowledge is also possessed by traditional healers and herbalists when they utilize traditional medicine to treat various ailments. Chavhunduka (1994) in his publication entitled, *Traditional Medicine in Modern Zimbabwe*, provided interesting facts about indigenous medicine in Zimbabwe. Chavhunduka, (1994) revealed that more than 500 different types of plants were being used for medicinal purposes in Zimbabwe in the early twentieth century. There are two interesting points in the study done by Chavunduka. The first one is that, of the 234 plants said to be of medicinal value in Zimbabwe, they are also used for treating medical conditions in other parts of Africa. The other point is that about 60 of these 234 plants are used in other African countries to treat the same type of conditions as in Zimbabwe.

Besides plants, traditional healers also discovered other forms of medicine, for example,

the use of parts of animals, birds, insects, snakes and fish as medicinal herbs (Chavhunduka, 1994:3). Examples which can be cited include: goats' milk has properties that treat *chipembwe* (whooping cough), while the *gavakava* (aloe-vera) plant has medicinal properties that treat skin rashes. While this kind of knowledge is unique to a few individuals, it has gained prominence even to others exposed to Western influence.

From an indigenous point of view, indigenous medicine has a spiritual foundation. The spiritual realm is authored by *Mwari* (Creator). This is why indigenous people in Zimbabwe and those in other other parts of the world believe that their well-being on Mother Earth is a spiritual journey. Thus physical ailments reveals the extent of some prevailing disharmony with the spirit world, and these are smoothened through performing some rituals to appease the spirits and maintain good relations with the spirit realm, which all links with *Mwari*, the Original spirit (Chavhunduka, 1994: 41).

Tacit knowledge in organizations either rural or urban communities enjoy unappalled importance. The reason is mainly due to the fact that tacit knowledge is unique and cannot be replicated by other organizations. So the unique characteristics which are hard to replicate in tacit knowledge gives some competitive advantage to those who possess the knowledge (Rouse, 1999).

In fact, there is a belief that certain forms of IK cannot easily be transferred to other communities. The forms may rely entirely on a particular community's set of beliefs, religion and spirituality. Outside one community, other IK beliefs are meaningless or useless (Rouse, 1999). This explains why African indigenous societies which rely on tacit knowledge in their daily activities enjoy an urge over foreign drawn ideas which may not

be applicable to other areas where they are not adaptable.

Therefore, tacit knowledge as Uriarte (2008:5-6) states is, “the essential prerequisite for making good decisions....creating value for the organization”.

3.2.3 Exploring Explicit Knowledge

Uriarte (2008) describes explicit knowledge as codified, that is to say it is knowledge stored in documents, databases, websites, emails just to mention those few. Explicit knowledge comprises anything that can be codified, documented and archived. These include knowledge assets such as reports, memos, business plans, drawings, patents, trademarks, customer lists and methodologies (Uriarte 2008: 6).

Documented knowledge represents an accumulation of the organization’s experience kept in a form that can readily be accessed by interested parties and replicated if desired. In many organizations, these knowledge assets are stored with the help of computers and information technology (Uriarte 2008: 6).

The explicit approach of IK knowledge management is also aimed at plugging in the knowledge gaps created by relying on the tacit dimension alone. Even (Nonaka 1991) explained that on its own, socialization is a rather limited form of knowledge creation. It is only when knowledge is converted from tacit to explicit and vice-versa that there is enough leverage by the whole organization to effectively utilize the knowledge. The same concept can be raised for possible application to the Gutu district case study. The indigenous educational processes prevalent and covering aspects such as spirituality (religion), commerce, agriculture, weather and medicine can be documented for the benefit of the future generations. However, while the creation, sharing and transfer of IK

are noble in terms of knowledge management, there are challenges encountered.

Chisenga, (2002) highlighted the fact that, the capturing and documentation of IK in Africa, like in other parts of the developing world, presented a number of challenges. Among the challenges are the following:

- Indigenous knowledge is tacit, i.e. it is mainly kept in people's minds, thus to reveal the knowledge, people should be willing to share IK they possess. Generally, communities and/or individuals may not be willing to share their IK with people from outside their community.
- The fact that IK is tacit knowledge also makes it very difficult to record, transfer and disseminate. In a community where providers and recipients speak the same language and share its underlying cultural concepts, IK is much more easily shared than transferring tacit knowledge across cultures (World Bank, 1998). The sharing of IK in one geographical setting help in further prolonging the existence of the knowledge to those who may wish to use it.
- For many people, IK means a livelihood. Mascarenhas (2004: 4) even remarked that the custodians of IK are aging and dying without a demonstrable plan to preserve their knowledge and transfer it to future generations. The reason is due to the fact that holders of IK be they farmers or healers, being the sole repositories of the information have an advantage of enjoying benefits from those who consult for their services. Therefore, individuals who possess IK, regard the knowledge as privileged and can be used competitively.

- There is also the danger of IK being exploited by multinational corporations without the local communities getting any form of compensation or benefit.

The points presented above were confirmed by the researcher as he conducted oral interviews with Gutu residents. A number of informants asked about the rewards they were to get for providing the information. The response I gave them was that as members of the communities where information was coming from, they were to benefit from the implementation of recommendations which are usually relied upon by government and the donor community in terms of improving livelihoods in communities.

3.3 Knowledge Management

The term knowledge management has been defined in different ways, but from most of the definitions, the purpose of KM is revealed as that of promoting processes of knowledge creation, sharing, transfer and retention within organizations.

Knowledge management therefore, can be regarded as the conversion of tacit knowledge into explicit knowledge and vice versa (Nonaka 1994, Nonaka & Konno 1998). On the other hand, knowledge management is the process of identifying, acquiring, distributing and maintaining essential knowledge to the organization (Uriarte, 2008:13). This definition is suitable for formal companies or organizations where the knowledge conversion processes follow (Nonaka and Takeuchi, 1995)'s knowledge conversion model, (SECI) as highlighted in Japanese companies.

Another scholar, Beckman (1997), views knowledge management as the formalisation of and access to experience, knowledge and expertise that create new capabilities, enabling superior performance, encouraging innovation and in the process enhancing customer value.

The definition is mainly concerned with the utilization of available knowledge enhancing materials in order to have a quality product that satisfies the consumer. Yet on the other hand, (Newman,1991) explains knowledge management as the collection of processes that govern the creation, dissemination and utilisation of knowledge.

For the purposes of this study which is looking at the role of Indigenous Knowledge in agriculture and environmental conservation in a rural case study, the researcher finds (Nonaka and Takeuchi, 1995) and (Newman 1991)'s definitions suitable for the study. These can be used to extract insightful information that determines the nature of livelihoods peculiar to rural communities.

The processes of knowledge creation, dissemination and utilization are achieved through various ways by rural residents in Gutu district. Mapara (2009) and Mawere (2010) in explaining ways in which knowledge is imparted to children in Zimbabwe's rural communities, made reference to the use of proverbs, riddles, folktales, songs, legends and myths. In using the aforesaid means, elders teach the youths about their experiences in the past so that the youths derive good lessons while discarding bad practices.

For example, the use of *zviera* or *zvierwa* (taboos) is a way of instilling discipline in both children and adults. Taboos were also known as "the inviolable" or "the sacred"

(Pearsall, 1999). They include both “real taboos” and “false taboos” (Mawere & Kadenge, 2010). False taboos were meant to keep check on children, but did not have the perceived consequences, hence false. However, in the case of true taboos, when violated by any person, young or old, the offender/ and his/her family would suffer serious consequences. The use of taboos helped in safeguarding natural resources from being over exploited in such a manner that it would end up creating challenges which are difficult to manage. The details of these groups of taboos shall be discussed later in the chapter.

Since this study is going to utilize the SECI model of Nonaka and Takeuchi (1995), it is necessary to highlight that when knowledge is created it should be useful in people’s livelihoods. Alavi and Leidner 2001 explain that when knowledge is generated, it should be preserved for future use. As an example, Chazovachii, Chigwenya and Mushuku (2010) embarked on a study in Gutu district in Zimbabwe.

The aim of the study was to assess the contribution of small grain crops in alleviation of poverty in Munyaradzi Communal areas ward 21 in Gutu District. The research used both qualitative and quantitative research methodologies to obtain information. The research administered the questionnaires as quantitative research tools. In qualitative methodology, group discussions and in-depth interviews were used to complement questionnaire responses.

The research identifies sorghum and millet as the small grain crops grown in Munyaradzi communal areas and the rationale being that they are adaptable to climate variability and poor soils. The research also revealed the resistance of these small grain crops to pests and diseases, low inputs requirements and are short seasoned varieties.

They are highly recommended to people with HIV, and AIDS because of their high nutritional value. They are useful for social values like, rain making ceremonies and memorial services, oil making and livestock feeds. The research recommends that for small holder farmers to increase their food security there is need to stop looking at small grain crops just as food crops for the poor in semi-arid regions but as viable food and cash crops that can be commercially produced for domestic and external markets. Furthermore, the research noted that success of small holder farmers depends on development of these crops by private and public sector institutions to ensure the availability of improved seed varieties and widening the range of products and utilization. Failure to promote small grains as advocated by this research the food security situation in Zimbabwe will remain elusive.

The above information can be related to the SECI model of knowledge creation which is tacit in nature, and is kept in people's minds. However, that is not the knowledge creation starting point; the creation dates back to the centuries' old philosophical thoughts of the great-great parents, and were passed down from one generation to the other until today. Since knowledge originates in the individual tuition, (Polanyi, 1966, Nonaka, Takeuchi & Umemoto, 1996), it blossoms through interaction between individuals that play a crucial role in developing individual thoughts and creating new knowledge (Nonaka, 1994). Thus, the information which Chazovachii, Chigwenya and Mushuku (2010) gained from the study dates back to years of past experiences. The knowledge was shared by residents through forums such as *dare*, (men's meeting place). Under such platforms, elders took the opportunity to teach and impart knowledge to young men who constitute the future generation. Likewise, young women

got their teachings in the traditional grass thatched huts from the elderly women. The teachings derived from the knowledge platforms discussed above is that the process of building knowledge base is quite intricate and stretches over a number of years up to a point of becoming people's way of living.

3.4 Indigenous Knowledge

The term indigenous knowledge is explained in different ways. It is viewed as a cumulative body of knowledge created over decades, representing generations of creative thoughts and actions, within individual communities in an ecosystem of continuous residence, in an effort to cope with an ever-changing agro-ecological and socio-economic environment (Kaniki and Mphahlele, 2002). Indigenous knowledge involves the utilization of local knowledge to enhance livelihoods. The knowledge is applied to areas such as agriculture, traditional health services, veterinary services, arts and crafts, music, dance and poetry. As an example, the practice of mixed farming practiced by a number of residents in Africa, including Zimbabwe saw Matowanyika (1995) commenting about the wisdom of mixed cropping saying:

The way that extremely different crops are grown together on the same plot of land (maize, groundnuts, plantain, taro, etc.) strikes western agronomists as something deeply primitive and anarchic. However on closer examination...one notes that the soil is under permanent cover, thus reducing sun exposure and heating of the surface soil; the variety of different root systems probably ensures a better utilisation of the soil volume; the succession of plant growth cycles means that cover is provided during heavy and erosive rains...large leaves of crops protect the soil; utilisation of solar energy is probably higher; the risks of parasite infestations are reduced (Matowanyika, 1995:54).

What can be deduced from the above information is that indigenous knowledge has its own benefits, though not scientifically proven by the traditional farmers who used the method, was found to be useful in different ways. The mixed cropping method provided food security, guarded against soil erosion and is an effective way of controlling pests.

What Matowanyika established can be compared with Akullo and Kanzikwera (2007) who carried out a study in Uganda to establish the challenges in the sharing of Indigenous Knowledge (IK) in agriculture. The study rested on the notion that the development of Indigenous Knowledge Systems (IKS) has been a matter of survival to the people who generated them. The study was conducted in western Uganda and it was an investigation of indigenous agricultural practices using local knowledge by researchers. The challenges from the study include; integration of conventional research with indigenous knowledge, storage and selective sharing of knowledge by farmers. The study determined a positive correlation between improved technologies and assets and access to extension services.

A qualitative study was carried out mainly employing a cross-sectional survey and the method was deemed suitable because it enabled the required information to be collected on several pre-determined variables of a single point in time and from a cross-section of fairly uniform group. A total of eight parishes from eight sub-counties were selected. Generic review of literature was also carried out to follow the changing context of agricultural research in Uganda.

The study revealed that Indigenous Knowledge are used by all farmer categories, its dominant, easily accessible, safe for man, animals and promotes social cohesion due to

the mechanism of dissemination. It showed inefficiency of some indigenous knowledge methods. The study concludes by recommending that indigenous knowledge and practices are useful, must be integrated with contemporary research agenda to enable farmers to compete and respond to global opportunities and challenges respectively.

The weakness in the study is that since IK is tacit in nature, it cannot be exhausted from the knowledge possessors through a cross-sectional study. There has to be verification of the data collected.

It should also be noted that Indigenous knowledge has been the basis for local level decision making in agriculture, health care, food preparation, education, natural resources management, and a host of other activities (Warren, 1991). Indigenous knowledge is further looked at as being dynamic and has evolved from years of experience; trial-and- error in problem solving by groups of people working in their environments, drawing upon resources they have at hand (David and Muchena, 2000). Considering that Gutu district has been ravaged by spates of droughts over the years, and that the area has become barren due to the indiscriminate cutting down of trees, there is need to establish means of survival. As earlier pointed out by Matowanyika (1995), the practice of mixed cropping has gained attention from agricultural researchers. Altieri (1987) explained the advantages that are associated with mixed cropping by saying that:

A traditional strategy to promote diet diversity, income generation, production stability, minimization of risk, reduced insect and disease incidence, efficient use of labour, intensification of production with limited resources and maximization of returns under low levels of technology.

(Altieri, 1987: 87).

In another study by Lwoga, Ngulube and Stilwell (2010), the study sought to explore small-scale farmers' perceptions and understanding of indigenous farming with an ultimate goal of promoting the use of IK for agricultural development in Tanzania. This study was mainly qualitative, where semi structured interviews were used to collect data from 181 small-scale farmers in six rural districts of Tanzania. Based on the study findings, it was evident that the local communities had an extensive base of IK and understanding of their environment, and they were able to put appropriate managerial skills and adaptive strategies to crop and animal farming. The findings also showed that IK was location specific, and farmers possessed IK on various farm tasks such as evaluation of soil quality, preservation of planting materials and crops, plant diseases and pest control and animal disease control. It is thus important to understand and facilitate the identification, documentation and use of this knowledge as well as integrating it with conventional knowledge for improved agricultural activities. The knowledge intermediaries (research, education information and knowledge services, and agricultural support services) should thus conduct regular user studies to identify, validate and document IK in order to determine areas that need intervention, and to enable the incorporation of IK into research to enrich the agricultural technology development process and make it relevant for farmers.

On the other hand, the managing of natural resources is an important teaching to the community. Some of the teachings can be linked to the experiences of Zimbabwe's war of liberation. For example, the traditional institutions, through spirit mediums, were educators for both the masses and the combatants, teaching those ways which could

help residents to live in harmony with nature, with rules and regulations aimed at protecting the flora and fauna.

However, the greatest 'drawback' of indigenous knowledge systems was that it had no written literature and this led the colonial masters to dismiss it as superstition and not scientific. Indigenous knowledge in natural resource management reminds us that knowledge and understanding is not only something that comes from scientists and textbooks. We need to be critical of all knowledge systems, scientific and indigenous and extract what is appropriate, combining the good from various sources to create a better and more sustainable environment.

The World Bank (1998: 4-6) compiled what they viewed as importance of indigenous knowledge to society and they comprise of the following:

- Indigenous knowledge is an important part of the lives of the poor. It is an integral part of the ecosystem. IK is a key element of the “social capital” of the poor as they struggle for survival, to produce food, provide for shelter or to achieve control of their own lives. The Chinyika Community Development Project, (CCPD) cited above is a good example of a project sustaining poor rural communities.
- Indigenous Knowledge also provides problem-solving strategies for local communities and helps shape local visions and perceptions of the environment and society. Some case study examples in Gutu district, cited above are living testimonies.

- Indigenous knowledge is of particular relevance to the poor in the following sectors: (agriculture, animal husbandry and veterinary medicine, use and management of natural resources, primary health care, community development and poverty alleviation). A good illustrative case study is that of Uganda by Akullo et al, (2007:6-10) in which indigenous medicines are successfully used to cure diseases of chicken, goats and cattle.

3.4.1 Oral tradition and Indigenous knowledge systems

Indigenous Knowledge has its roots in oral tradition. Ndiaye (2001) cited by Raseroka (2002), described oral tradition as:

... a primary oral form, the use of the information which a society deems fundamental and wishes to preserve and codify, in order to facilitate memorization of it and to make sure that it is passed on to the present and future generations.

Due to the richness of the Indigenous Knowledge Systems (IKSs), there are various knowledge domains which are transmitted through oral traditions. These include genealogies of families, class and groups, myths and sacred stories such as rituals, folklores, proprietary expressions and mysteries. It also includes coexistence among communities and the interaction between human beings and natural systems or the environment (Raseroka, 2002: 2)

Sukula (2006) also explains that Indigenous Knowledge (IK) comes in the form of local creativity, innovations, and know-how and is the basis for decision-making, and the content of education applies to local societies and is a strategic resource for sustainable development. Therefore, IK is an outcome of experiences and local innovations that

have accumulated over generations, and shared by local people in their community through oral traditions and demonstrations.

3.5 Indigenous traditional agriculture

The type of agriculture practiced by African societies before the colonial era was traditional and suitable to the time. The knowledge exhibited in agriculture, reflected vast experiences, accumulated over several years of understanding the soils, plants and the weather conditions of the areas where people lived.

Similar to the above indications, a study carried out by Pitakia Tikai & Aaron Kama (2009) in Samoa, aimed at identifying the Indigenous Knowledge used in agriculture. The agricultural practices of the people of Samoa reflected an accumulation of experiences and intimate understanding of the surrounding environment. This research covers Indigenous Knowledge on farming tasks involving the managing of soil fertility, controlling pests and diseases, controlling weeds, soil preparation, planting materials, harvesting and storage of indigenous root crops and animals in Samoa.

The agricultural practices showed that Indigenous Knowledge should be recorded and used to devise innovative research for agricultural researchers, extension workers, development practitioners, and environmentalists for sustainable agriculture development and management of Samoa's natural resources. Indigenous Knowledge addresses sustainable food security and the conservation of the variety and variability of animals, plants and very vital soil make up such as physical, biological and chemical properties. The conservation of Samoa's natural resources depends on human beings and their interaction with the environment which is very much related to the

Indigenous Knowledge that has been communicated and passed down from generation to generation through family members and communities.

In Gutu district for example, the climatic conditions are generally hot and dry for the greater part of the year such that the region is prone to drought with rains ranging between 400-600mm per year. Due to the low amount of rainfall, Gutu residents grow indigenous crops such as *mapfunde* (pearl millet), *rukweza* (finger millet) and *mhunga* (sorghum). The traditional crops are more resilient to the low rainfall such that residents have something to harvest for food. However, the majority of the residents prefer to grow the maize crop despite the fact that maize fails in most of the seasons (Gutu Agriculture, Technical and Extension Services, 2011). The situation was worsened by the fact that there were changes from the traditional farming methods which residents used in the early 1920s. The traditional farming methods used by Gutu residents are discussed in the following sections:

3.5.1 Rotational farming

The communities in Gutu changed from rotational farming after the introduction of the Segregation laws in the 1930s. Rotational farming involved the clearing of a piece of land; grow crops for several years until there is need to shift to new land. When farmers shift to fresh land, the previously farmed land is left fallow until vegetation recovers and soil nutrients are restored through natural processes. Since farmers relied on manure from decomposed tree leaves and rich ant-hill soils, the rotation system afforded them good harvests from the rich fertile soils. However, this practice was disrupted by the colonial policies. This was due to the introduction of colonial pieces of legislations such as the Land Apportionment Act of 1930 and the Land Husbandry Act of 1951. The Acts

divided the African population into two categories: “farmer” and “non farmer”. Small plots were allocated to “farmers” in the native reserves. Those farmers temporarily working in towns or on commercial farms were placed in the non-farmer category, and were denied access to agriculture land (Stoneman, 1981).

The disruption of African agricultural practices marked the beginning of a sad story in Gutu district. What the colonialists did was a replacement of indigenous agricultural practices with what they called, “*more acceptable and efficient methods*” (Hart & Vorster, 2006). However, the farmers remained poorly resourced, compared to the white large scale commercial farmers. As was the case in other countries such as South Africa, in Zimbabwe, almost 90% of African farmers relied on saved seed as the primary source of planting material (Orton, 2003). Other sources of obtaining seed include exchange with neighbours and relatives (often associated with local cultural practices) or exchanging with and purchasing from extension services, local markets and rural supply stores (Orton, 2003: 23).

3.5.2 Sustainable Agriculture: The Samoa lessons

The state of agriculture in Gutu district can benefit from the suggestions which came out of the study done by Pitakia Tikai & Aaron Kama (2009) on sustainable agriculture in Samoa. The suggestions include the following:

- Traditional knowledge is vital to sustainable development of Samoa’s natural resources. Sustainable Agriculture development and conservation of Samoa’s resources could be significantly advanced if modern scientific knowledge could be incorporated with the traditional knowledge system.

- Much of the IK has been lost since early European colonial and more recent internally Eco-colonialism. Whether traditional knowledge used in Agricultural production will survive the millennium remains the question of time. There should be awareness programme about the value of IK for development in order for the communities' to conserve their indigenous knowledge.
- Small scale farmers in Samoa rely on IK for agriculture production because it is efficient and cost effective.
- Sustainability of Samoa's natural resources and agriculture production depends on Indigenous Knowledge and traditional farming.
- Central and local Governments, environmental community and universities could become components of valuing, preserving and protecting Samoa's invaluable traditional knowledge before it disappears forever.
- IK should provide effective alternatives to western know-how. It should provide local Samoan, development workers or extension workers extra opinions when designing projects instead of searching only western technologies for feasible solutions. They can either choose from IK or combine indigenous and western technology in the development program.

The following recommendations have been derived from the conclusions of the Samoa research study. Since IK is important to sustainable agriculture, it is:

- Recommended to do proper recording and documentation of IK used for agriculture. However, when recording, it is important to find who knows what in

order to tap the right source. Otherwise data will not truly reflect IK in the community.

- Recommended to do research in improving IK used for agriculture by integrating with western technology.
- Recommended to preserve, protect and use IK to promote sustainable (ecological, socially and economically) agriculture development.

3.5.3 Intercropping

The practice of intercropping was part of the indigenous farming methods and was also known as mixed cropping. The practice of intercropping dates back to the earliest times in agriculture. Reports from West Africa show that crops such as cowpeas, millet, sorghum and yams were cultivated as mixed crops in the ancient empires of Ghana, Mali and Songhai (Lewicki, 1974). On the other hand, (Faulkner & Mackie, 1933) also reported of widespread intercropping in Africa and the reluctance by farmers to abandon the system. There are early studies which were conducted on the advantages of mixed and they include: (Briant & Johns, 1940; Edwards, 1941; Osiru & Willey, 1972 and Dakora, Akanuwe & Mahama, 1988).

Mixed cropping is a common cultivation method although it is discouraged by modern day agriculturalists since they are of the view that it discourages specialized cropping. The intercropping systems come in different forms which include: mixed cropping, whereby two or more crops are grown simultaneously with no distinct arrangement; row intercropping, where two or more crops are grown simultaneously planted in a row; strip intercropping, where two or more crops are grown in different strips; and relay cropping

whereby a second crop is planted after the first has reached its reproductive stage of growth but prior to physiological maturity (Dakora, 1996:110).

3.5.4 Benefits of intercropping

The benefits of intercropping are many and diverse. They include the following:

- Increased protection from erosion. This is made possible by the fact that the numerous plants grown including the spreading African vegetables reduces exposure of bare ground to direct impact from rain drops, which causes soil to wash away.
- Insurance against total crop failure in the event of the other crop/s fail due to insufficient rains or pest infestation. The growing of maize, mixed with cowpeas for example, helps in the event of the maize crop failing due to moisture stress. The plant has an advantage of early maturity and will also be sheltered by the maize crop from direct heat; therefore it takes time before the crop yields to wilting.
- Efficient utilisation of resources by plants of different heights, rooting systems, and nutrient requirements. For example the traditional short varieties of maize when intercropped with beans, both crops perform well when widely spaced. (Francis, Flor & Temple, 1976).
- Promotes even spread of labour and harvesting during the cropping season, thus minimizing storage problems. Usually farmers combine their effort, men and women to ensure that the harvesting is quickly done and the crops are preserved at the same time.
- Facilitates the production of many commodities in both small and large

quantities in a limited area. This usually applies to a situation where the maize crop is mixed with cowpeas. The maize harvest during a good rain season can have higher yields while the cowpeas plant may have lesser quantities just because it will not be the major crop on the plot.

- Reduced spread of diseases and pests in mixed cropping compared to sole cropping due to species differences.
- Where legumes are involved, increased nitrogen benefit to companion cereal crops from biological nitrogen fixation. An experiment conducted by (Dokora et al., 1987), revealed that when cowpeas is planted together with the maize plant, there is nitrogen fixation and nitrogen contribution, a development which promotes a balance of soil nutrients.

Intercropping has a number of advantages to the farmers. For instance, cowpeas offer good food when it is boiled and eaten as a meal, while the African vegetables are used as relish during the summer season and at times is dried to provide a nutritious diet in winter when food resources are scarce. Finger millet which can be mixed with the maize crop, is used for the preparation of *sadza rezviyo* (thick porridge) taken as the main meal. On special occasions, finger millet is fermented and is used to brew *ndari* (traditional beer) either for monetary benefits or in order to appease *vadzimu* (ancestral spirits). Finger millet can also be made into *mahewu*, (sweet non-alcoholic drink) which is taken after meals Muchineripi, (2008).

3.5.5 Conservation Farming

The farming method dates back to the pre-colonial period in which inhabitants of some parts of Africa did not have mechanized tools for agricultural production and had to rely on the digging hole. Conservation farming is also known as conservation agriculture. The practice is, “a concept for resource-saving agricultural crop production that strives to achieve acceptable profits together with high and sustained production levels while concurrently conserving the environment” (FAO, 2007).

Conservation farming is a labour intensive farming method which uses zero tillage. It allows farmers to make use of available resources in their environment, such as manure, grass, decomposing tree leaves as well as equipment that is easily accessible, such as a hoe. The hoe is used to dig a planting basin in which layers of manure and soil are used to fill up the planting basin up to the point where the seed is planted and is covered to prepare for germination. The field is then mulched using grass. Conservation farming has gained prominence among Gutu District residents particularly those who are working in conjunction with Oxfam, a non-governmental organization. The farming method was adopted as a mitigation measure following years of successive droughts in Gutu district due to below average rainfall. More so, conservation farming has the advantage of low cost inputs (Oxfam Blog 2010). Conservation farming is friendly to the environment since it allows soils to regain compactness and fertility, a development which helps in the protection of soil against erosion.

3.5.6 Benefits of Conservation agriculture

Conservation farming is associated with numerous advantages and these were highlighted by Dr. Joseph Mushonga, a Community Technology Development Trust plant breeder. When presiding over a field day function for one successful conservation farmer in Chihota district, South East of Harare, (Mushonga 2011) highlighted the benefits of the farming method as follows:

- Improves food security since it copes well with drought conditions;
- Helps conserve soil moisture at the same time improving soil fertility;
- It is a low input technology and it helps crops adapt to changing climatic conditions;
- Ensures minimal soil disturbances – (instead of ploughing the entire field, individual planting basins are prepared by a hole;
- Use of mulch such as grass, leaves, crop residue and manure conserve moisture and enhances soil fertility;
- Diversified crop rotations and intercropping help improve soil structure and minimise pest outbreaks;
- With timely land preparation and weeding, farmers can get yields even if there is drought;
- Mushonga revealed that studies in recent years in Zimbabwe, had findings that shows conservation farming as generally producing on average more maize per hectare than conventional farming;

- Techniques used in conservation farming use less fertiliser and other chemicals which are expensive and not yet accessible for the majority of smallholder farmers;
- Minimises farmers' dependence on expensive technologies and inputs (chemical fertilizers and pesticides, expensive seeds, including genetically modified ones);
- Even though it is labour intensive, it helps farmers to make the best use of local resources such as decomposing tree leaves, crop residue and cow dung to provide nourishment to the crops and to protect them from pests and diseases;
- At every stage, soil and water conservation is emphasised. Soil erosion caused by water and wind is checked, collection and growth of traditional seed is stressed (Mushonga, J. 2011, Herald Newspaper).

Apart from the several advantages raised by Mushonga, farmers themselves expressed some remarks which heaped a lot of praises on the conservation farming method. The Chihota farmer had this to say, "Conservation farming is a trailblazer for ending hunger" (Herald Newspaper, 21 March, 2011). In Gutu district, some farmers under the Oxfam project expressed the following sentiments about conservation farming:

"We do not have cattle for draught power, but now we do not have to beg those with draught power to lend us theirs." (Raina Mukaratai, Oxfam Southern Africa Blog, 2010)

Farmer Daniel Mukove (45) said:

"Practising conservation agriculture has helped me to be more focused in my farming activities

than before. I am less worried when agriculture season starts and am now able to to plan well".

Ephilda Manyonganise (45) said that by practicing conservation farming they were able to plant ahead of those with draught power. She said they prepared their fields and are ready before the first rains come. "We have real big chances of a bumper harvest this year," said Ephilda (Oxfam Southern Africa Blog, 2010).

3.6 Traditional crops

The majority of subsistence farmers in Africa and Zimbabwe in particular, grow traditional crops for food security and sustainable livelihoods. In Gutu district, it has proved difficult to attain good yields from maize production since maize requires high volumes of rainfall which is above 600mm per year (Chazovachii, et al. 2012).

Unfortunately, the majority of Gutu residents regard maize as their staple food; but yields are always poor due to low rainfall (Muchineripi, 2008). The adverse conditions have forced farmers to revert back to the traditional small grain crops such as finger millet, pearl millet, and sorghum. The small grain crops have an advantage in that they are resilient and versatile to pull through moisture stress conditions. Apart from the resilience, there are other distinct advantages associated with finger millet.

In a research carried out in East Africa (Mgonja et al. 2007) had interesting findings on the advantages of the finger millet crop to farmers. Finger millet has the following benefits: it is highly nutritious, containing high levels of amino acids absent in most

staple cereal crops. The high levels of iron and micronutrients mean it is an ideal food for diabetics, the elderly, and people living with HIV (Acquaah, 2002). More so, as a small grain crop, finger millet is naturally resistant to insects and pests when stored. Finger millet is also a versatile crop. It can be processed to make flour, cakes, biscuits and bread. A summary of finger millet merits are as follows:

- High nutritious value: contains 40 times more calcium than maize;
- High levels of amino acids;
- Adapts well to variations in climate and rainfall;
- Thrives in poor soils with limited moisture;
- It can be stored for up to 30 years;
- They have higher market value than other cereals, including maize;
- They have high productivity, the new seed varieties have more than doubled crop yields;
- There is an increased demand for processed finger millet products;
- They can be fermented into beer, or made into sweet non-alcoholic drink (Mgonja, M.A., et al: 2007: 19)

The above benefits among other considerations are the reasons which motivated Muchineripi (2008) to introduce the Chinyika Community Development Project (CCDP), which mainly specialized in the growing of finger millet on a large scale basis.

3.7 Indigenous Knowledge and Gutu District

Indigenous Knowledge of any given area has a great role to play in shaping the lifestyles of the residents. According to a research conducted by (Svotwa, Manyanhaire & Makanyire, 2007) about the people of Chitora communal lands, Manicaland province, in the Eastern parts of Zimbabwe focus was on how Indigenous Knowledge systems were used in weather forecasting.

The findings of the study were that sacred mountains like the Ndorwe, Tsetsera, Binga and Ngoya on the eastern borders with Mozambique are used to forecast the weather. When the mountains tops are covered by mist, it signifies the coming of rains within twenty-four hours. And in some other instances, when the mountains experience spontaneous outbreaks of fire during the months of September and October, it is regarded as a sign of a good rain season.

Then when the sacred mountains ignite spontaneously as the summer approaches, it signifies the coming of rains within a week or so, and activities like land preparation and dry planting of pearl millet, finger millet and vlei maize would normally start (Svotwa, Manyanhaire & Makanyire, 2007: 59-60).

Similarly, oral testimonies from some of the Gutu residents associate Rasa Mountain with weather forecasting, whereby if there are fire-outbreaks in the month of October, it is a sign that the rain season is imminent and therefore people should begin dry planting of grain crops such as finger millet, pearl millet and sorghum (Interview: Chief

Nyamande, 2011). Similar weather forecasting from the natural environment are derived from the Calvert measurements which records, “ a rare to occasional fire in the late hot to early rainy season reaching aerially destructive proportions only in relatively small areas or patches of, say, 0.01 ha to a hectare or two before being extinguished by accompanying rain”. That phenomenon is typical of the events associated with the *Rasa* Mountain in Gutu district. When the mountain experience sporadic fire outbreaks around the month of October, rains will fall within a few days to extinguish the fire.

Another tradition followed by Gutu communities is the *Mukwerera* (rain making ceremonies). These are usually conducted as a response to the dry patterns of weather. *Mukwerera* is conducted at specific locations such as near rivers or at the foot of mountains or under big trees (Mujere, 2007). The ceremonies are conducted at specific periods of the year between October and January. On the other hand, Gata, (1993: 3) argues that weather was forecasted through different ways, for example, residents predict the onset of the rain season using signs such as changes in leaf colour of certain

tree species, shift in wind direction, cloud formation, and bird and beetle songs and their seasonal migration. The signs are useful to areas which observe the indicators which usually helped farmers in decision making relating to land preparation, planting time and the type of plants to grow.

The environment is always viewed in high esteem by indigenous Zimbabweans, hence upheld with reverence. Notable, is the tripartite relationship involving the living human beings, the natural habitat and the spiritual world. Gonese (1999) explains that the

existence of each of the three worlds dependent on the other. In order to promote conservation of resources, there is respect and belief by human beings that the natural world is the habitat of the spiritual world and provider of foods, minerals and other resources hence should be safeguarded. It follows therefore that the upholding of traditional practices by Africans is the reason why many indigenous Zimbabweans believed in sacred existences. These include creatures such as *njuzu* (mermaid), which is a fishlike spirit-medium that stay in water, sacred woodlands, wetlands and mountains. In order to ensure that conservation practices are adhered to by residents, people should strictly observe what Tatira (2000) referred to as *zviera* (taboos). Taboos help in the conservation of natural resources, Chemhuru & Masaka (2010: 121) even said that:

...Shona taboos foster a sustainable use of the environment. Among the Shona, an unconscious appreciation of certain environmental taboos informs an esoteric environmentally based knowledge that is meant at sustainable use of natural resources.

Therefore, it means that when residents observe the avoidance rules of taboos, it helps in regulating people's behaviour towards the destruction of nature.

The taboos are grouped into categories such as: taboos protecting the water and wet lands taboos protecting the natural vegetation and wildlife, taboos protecting endangered non-human animal species (Chemhuru & Masaka, 2010). The nature of the taboos and their teachings will be discussed in subheadings ahead.

3.8 Transfer of Indigenous Knowledge

Considering that Indigenous Knowledge may reside in an individual's mind, there are different ways in which the knowledge is shared by those who possess it. In order to benefit from IK, one should consider the nature and modes in which knowledge in people's minds can be communicated to the intended recipients. Indigenous Knowledge is stored in people's memories and activities; hence it is transmitted through different ways (Nonaka & Takeuchi, 1995). Indigenous knowledge can be expressed through stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local languages and taxonomy, agricultural practices, plant species and animal breeds. As one moves from one society to the other indigenous forms of communication have a role to play in local level decision making processes and in the preservation and spread of IK (Grenier, 1998).

The knowledge that can be shared by residents relate to farming, weather forecasting, animal and livestock breeding, usage of environmental natural resources and the preservation of crops just to mention those. In order to understand the knowledge sharing process, one can refer to the study on social engagement conducted by (Koskinen, et al. 2003). The study investigated knowledge acquisition and sharing by participants in the context of a work project.

Since the investigation focused on the utilization of tacit knowledge, the findings were that as team members interact face-to-face with each other, there is reinforcement of tacit knowledge sharing. This in simple terms means that tacit knowledge is easily acquired through socialization activities such as imitation and coping as explained by

Nonaka and Takeuchi (1995) in the knowledge conversion theory. The fact that IK as a body of knowledge has developed over generations through the process of man interacting with the environment, its continuity depends on its transmission and the ability of the young generation to acquire and practice it (Atteh, 1980). The manner in which Indigenous Knowledge is shared and transferred is further investigated in the following sections:

3.8.1 Use of taboos

When the Shona people of Zimbabwe use taboos, Chigidi (2009) argues that it was meant to influence community members to conform to societal values and norms. On the other hand, Duri and Mapara (2007) say that taboos were designed to enforce positive societal attitudes towards the environment, while Masaka, (2009) is of the view that taboos were intended to protect non-human animals from cruelty by human beings. In the event that one violates Shona taboos, it was believed that it would invite an angry reaction at a supernatural level (Tatira, 2000). So this creation of fear of the unknown discouraged the would-be offenders from negating the society moral code.

Coincidentally, Africans in general have a belief in the supernatural world, hence the Shona abide by avoidance rules (taboos). Tatira (2000) went further to state that the violators of the Shona moral code as contained in taboos, invited misfortunes for the community and to the individuals themselves. The misfortunes might come in the form of bad luck, diseases, drought and even death. The Shona taboos were categorized in such a manner that society embraced the moral code implied which encouraged one to be a responsible member of the society by living in harmony with nature.

3.8.1.1 Environmental thrust of taboos

The Shona people in general and those in Gutu district in particular look at the environment with great importance and regard the environment as an inseparable part of the human community. The importance given to the environment is best understood from the contention made by Mbiti, (1969), expressed as *“I am because we are”*, it is an expression which affirms the relationship between the individual and his society, which can also be related to the relationship between the human community and the environment. The “I” in Mbiti’s declaration takes the interests of the individual human persons, while the “we” becomes a broader term referring to the human community and the environment. In that context, the assumption is that the society is what it is because of the existence of the environment that provides it with some of its needs and wants. Therefore, it is an expectation to the human society that as they interact with the environment, they should ensure a sustainable use of natural resources in the environment, be it fruits, wildlife, water sources, vegetation and endangered non-human species (Chemhuru and Masaka 2010). Considering the depleted environmental conditions characterizing Gutu district today, one can make assumptions on the following possibilities: violation of taboos, overpopulation in rural communities, lack of enforcement of local laws by traditional leaders, poor farming methods, uncontrolled cutting down of trees, ineffective guidance from the Environmental Management Agency (EMA) among other factors.

3.8.1.2 Taboos Protecting Water Sources

The importance of water can never be overemphasised since it is crucial in sustaining lives of all living things, hence this common expression, *mvura upenyu* (water is life). The uses of water are many and these include: cooking, drinking, washing, bathing, irrigation and sustaining of the vegetation among other uses. In order to ensure the protection of this valuable commodity, there are taboos which were meant to protect all water sources like rivers, pools, dams, wetlands, wells and springs (Mapara 2007). For example, as a way of protecting and ensuring cleanliness of the *tsime* (well), a source of household water supplies, there was a taboo which says, *ukachera mvura nechirongo chine matsito, tsime rinopwa*, loosely translated as (If you fetch water with a sooty black pot, the well will dry up) The prohibition covered all other water sources like dams, rivers and pools. In Gutu district, there are water sources associated with myths and sacredness. The water bodies are believed to be residence to *njuzu* (mermaids), and Gonese (1999) highlighted the existence of such spirits when he discussed the Shona underworld.

While not disputing the existence of mermaids, Tatira (2000) raised a different explanation which suits what he termed “false taboos”, meant to enforce the issue of cleanliness on water sources, he thus remarked that taboos “...are vital in transmitting values on issues pertaining to hygiene”. The same sentiments are corroborated in another taboo which states that, *ukaitira dope mumvura, unozorwara nechirwere chehozhwe* (if you urinate in a water source, you will suffer from bilharzia) The consequences associated with the mischief was something the offenders would not

want to experience, more so, being linked to the invisible forces of the world, the fears thus promoted harmony with nature as corroborated by Tangwa (2006).

3.8.1.3 Taboos protecting the natural vegetation and wildlife

The natural vegetation and its wildlife have an intrinsic value, of which, Duri and Mapara (2007) explain as designed to develop positive societal attitudes towards the environment. This involved restricting the cutting and using of certain types of vegetation. In Gutu district for example, there are natural vegetation and wildlife that are reserved because they are believed to be hosts of some spiritual forces. It is therefore taboo to go against prohibited acts in places such as the Rasa Mountain, in the South eastern part of Gutu. Duri and Mapara (2007) uphold the view when they wrote about the myth of an alleged disappearance of members of the apostolic church who went up the sacred Guruguru Mountain in Shurugwi district to conduct a church service. Similar myths are also said about the Rasa Mountain, for instance, people who went up the mountain, were not allowed to gather fruits to take home, instead, they were supposed to eat and leave when satisfied. It is believed, that individuals who disobeyed the instructions would risk getting temporarily lost or disappearing forever and in some cases become insane. While the sacredness of these places is debatable, the fact of the matter is that myths helped in ensuring a harmonious relationship between human societies and the whole of nature in communities surrounding the Rasa Mountain. Another aspect which contributed to the reverence of the Rasa Mountain is its symbolic importance to the Gutu communities. For instance, it has been observed by the locals that the sacred mountain developed some natural fires as a way of informing

people of the advent of the rainy season (Dewa, 1992). Therefore, because of this belief, it is assumed that if such sacred areas were tempered with, traditional weather forecasting would be hindered thereby adversely affecting the local farmers' agricultural plans.

The wanton destruction of the vegetation has far reaching effects since it affects several facets of people's lives. Other than depriving people of sources of firewood, wild fruits, natural habitat for wildlife, different trades are also affected such as *n'angas* (traditional healers) and *vananyamukuta* (midwives). Mavi and Shava (1997) came up with suggestions to conserve medicinal plants in Zimbabwe such as discouraging the cutting down of indigenous trees, planting fast-growing exotic and indigenous trees for domestic use as well as introducing the national tree planting day and the creation of natural reserves. The suggestions seem to be an answer to complaints by traditional healers and midwives of having to travel long journeys to secure herbs since the local vegetation, which was source of their herbs, have been wantonly destroyed. Apart from effects on the latter groups, there were some consequences on wildlife habitats, grazing areas, and climatic conditions. As a measure to protect the natural vegetation, there were some environmental taboos which were passed down from one generation to the other. These include the following: *ukatema muhacha*, *mvura haizonaya* (if you cut down the *parinari curatellifolia*, it will not rain). Duri & Mapara (2007) explain taboos which relate to prohibitions on fruit trees. Trees such as *Muzhanje* (*vakapa kirkiana*), the *Mutamba* (*strychnos species*), *Mutohwe* (*azanza garkaena*) and the *Munhengeni* (*ximena*) are not supposed to be used as firewood. These explanations were coined in order to protect the tree species and ensure a continuous supply of fruits that provided

indigenous people with food and natural sugar which were important for their health.

Rusinga and Maposa (2010) also gathered from the Ndau people, in South-eastern Zimbabwe that the *Mutarara* (*Gardenia globiflora*) tree is not supposed to be used for any homestead tasks like construction purposes. The reason is because it is placed on top of graves to protect the corpses of the dead people against witches. The selective use of tree species is deeply rooted in the Ndau people and it posits an intimate relationship between their social life and environmental management. As they asserted the conservation practices among the Ndau, Rusinga and Maposa (2010) acknowledged that the people are “educated” from cradle to death not to cut trees or do any activity that is destructive to the natural landscape. This strongly explains the two researchers’ observation that the area is still endowed with forests and they are abundant in diverse species including the common miombo woodland species such as *Munondo* (*Julbernadia globiflora*), *Musasa* (*Brachystegia spiciformis*) and *Mupfuti* (*Brachystegia boehmii*). All these are indigenous tree species which have become rare in some areas where destruction went on unchecked.

Other taboos were supposed to protect the wildlife and one method to achieve this was in the concept of the *mutupo* (totems). Zimbabweans in general and the Shona people in particular, those of Gutu district included, hold the concept of totems in high esteem. It is therefore taboo, among the Shona people for one to eat one’s totem animal (Bourdillon, 1976). The taboo associated with the reverence of totems was that *ukadya mutupo wako, unozobva mazino* (if you eat your totem animal, you will lose your teeth) Aschwanden, (1982:120). The strategy helped in preserving wild animals, (the kudus, buffaloes, zebras and wild pigs) against total eradication. Gelfand (1973), clarified the

conservation strategies as based on "...the principle of exogamy" where one group of people or families among the Shona communities, depending on patrilineal identity, is prohibited from eating certain nonhuman animals, birds and fish species as a way of regulating their usage. Duri and Mapara (2007) reiterated the importance of taboos with regards to totems saying that, "...were institutional wildlife conservation measures meant to preserve various animal species so that they could be saved from extinction due to unchecked hunting." So, it is clear that taboos were used as a prohibition aimed at conserving wildlife from being completely wiped out.

3.8.1.4 Taboos protecting endangered nonhuman animal species

The Shona people also used taboos as a way of safeguarding the extinction of some rare nonhuman animal species such as pythons, pangolins, fish and rhinoceros (Chemhuru & Masaka, 2010). The taboos did not only prohibit the unsustainable use of nonhuman animals, but also prohibit cruelty to creatures, especially those that are defenceless and harmless. Some taboos meant to safeguard the creatures include one like, *ukauraya shato, mvura haizonayi* (if you kill a python, rain will not fall). The python is a rare, innocent, symbolic reptile (though, at times, very dangerous when provoked), it is one snake, among other creatures, that are protected by the Shona society. For the Shona people, the python has some symbolic importance. As such it was believed that if a young person who had never had sexual encounter sees a python that was *shura* (bad omen) usually, the bad omen manifest in the form of sickness or death of a very close relative. The belief helped in the protection of the python as an endangered species and according to African beliefs, a python is symbolic in foretelling future events for human beings. There is also fear of inviting drought as a result of killing the python. The belief acted as a deterrent to unnecessary killing of endangered nonhuman

animal species such as the python, (Chemhuru & Masaka, 2010).

In Gutu district, taboos are part of the elders' teachings to their children, mainly the male children while around a fire at the *dare* (men's meeting place). Children were expected to uphold the teachings by elders so that society would live in harmony with nature. The same applies to people being discouraged from killing defenseless and innocent creatures, such as frogs, it was meant to safeguard the ecosystem. Failure to safeguard such innocent creatures posed the dangers of which Singer (1985) expresses as "when we, humans, change the environment in which we live, we often harm ourselves". Take for instance; the unchecked killing of frogs would disturb the ecosystem and there were possibilities that snakes would end up in homes hunting for other preys like rats, and this would endanger people's lives. Thus, the unchecked destruction of other creatures may not have adverse effects on the species per se, but also on human beings as well.

3.8.1.5 Taboos of the Rukwa nature (Fencing property using charm)

Mawere, (2010) defines *rukwa* as a medicine or a charm used to safeguard or fence (using charm) property from thieves and invaders. This practice is common among the Shona people, especially in the countryside; though not many people who use the method are open about the practice. The practice of using the fencing charm is intended to protect people's valuables such as homesteads, livestock holdings (*kraals*), crop fields, granaries, gardens and orchards. The practice is also common in the Southern African region. Mawere (2010) revealed the information in an interview he held in the Manica Province, Mozambique (2010), when one traditional healer, Sekuru Gogoyo, had this to say:

Rukwa is used to safeguard one's property by mysteriously catching the thief, preventing him/her from escaping until the owner arrives. One of the most common methods of administering rukwa is the use of a small bottle. One would secretly put some traditional herbs (given by a traditional healer) in the small bottle, and dump it at the doorstep of his/her bedroom, shop, or field (where he/she wants to protect the property). The magic charm would catch any thief that dares coming in to steal away the property.

Any thief that dares to steal away property risks the humiliation of being caught in the act by the owner, as he/she would not be able to leave the premise because of the power of the magic charm. As Mawere (2010) puts it, citing the informant, "The thief can only be freed when the owner comes, summons the community to witness the event, and then strikes the thief two to three times using a whip" said *Sekuru* (old man) Gogoya.

However, there are other people, who due to Western influence, link *rukwa* to witchcraft. But, in terms of indigenous practices, its logic is understood as a method of securing one's belongings from being stolen using traditional medicine. In essence, and as explained by Mawere (2010), *rukwa* is meant to tame thieves into becoming fully responsible citizens who respect and value other people's property by not tampering with it or stealing. Those who attempt to steal other people's belongings are always caught in the act and will suffer embarrassment or are fined. In fact, Shona societies are accommodative in that they extend a helping hand to those who honestly request for assistance when there is genuine need. The other ways in which people were taught valuable traits of life were through the use of proverbs, riddles, songs, rituals and community laws to ensure that their IK is transferred to the younger generations for posterity. The teachings covered areas which involved people's day to day lives such as

agriculture and living in harmony with nature.

3.8.2 Proverbs

Mapara, (2010:145) explains that proverbs are summary statements of generalized truths that have been accumulated through the experiences of preceding generations. Proverbs have an educational value in that they were used by elders to teach youngsters about experiences of the past that they should emulate or avoid. Similarly, proverbs were also used to inculcate in youngsters a sense of responsibility. For example, some of the proverbs include the following: *Mbeva zhinji hadzina marise*

(Too many mice do not build a nest). The latter proverb was meant to teach a sense of responsibility in the youngsters since laziness was likely to crop up if people work in groups. The assumption would be that someone else will do it, and it becomes a trend at the expense of work to be done. The use of proverbs within the Gutu district communities is a common way elders use to educate their children on different life situations. It is common to hear parents, when reprimanding their children for wrong doings, remarking that: *Ramba kuudzwa anoonekwa nembonje pamhanza* (Disobedience leads one to incur scars on the forehead). From the statement of the proverb, it is clear that parents and elders in general used examples of experiences that they may have gone through or observed. These became life-long lessons transmitted from one generation to the other. Through proverbs, people were taught to be good farmers by encouraging hard working in agriculture. There were also teachings which encouraged the conservation of natural resources through the teachings of dos and don'ts when dealing with environmental factors.

3.8.3 Riddles

The use of riddles by elders was meant to foster quick thinking on the part of the youngsters. A riddle is a combination of education and entertainment aimed at teaching children about their environment in an entertaining way (Mapara 2009: 145-146). The same view had been raised by Lusweti, (1984:30) who explained that riddles were a type of art form that involves metaphoric or poetic comment on things within the environment. An example of riddles is *Tambatamba chidembo muswe ndakabata* (skunk continue fidgeting but tail I hold firm). A skunk is a small nocturnal animal that exudes an unbearable stinking smell as a protective mechanism against danger. Among the Shona people, the inference is a hoe, which is equated to a skunk. Since the hoe is the cultivation tool for the rural farmer, it thus calls for one to be firm in carrying out the tough field work if good harvests are to be realized.

So the inference to the skunk is in the sense that if one dares catch it by the tail and it exudes the smell, then to continue holding would be sheer determination.

While riddles invoked quick thinking in the youngsters, in a way it was intended to urge future parents to be determined workers in order to accomplish life goals. The use of riddles as a way to teaching youngsters has challenges in today's world. Chigidi (2009) explain the problems within the context of urbanization and industrialization which brought about consequences of high social and geographical mobility. Apart from that, many children in Zimbabwe got access to education after independence in 1980, and that made it difficult to sustain the practice of yester year life styles in its original form (Chigidi, 2009).

3.8.4 Songs

Songs were used as an educating tool. The most common and popular song as cited by Mapara (2009) was *Sarura wako* (make your choice) which taught youths about qualities of a good wife/husband. Usually, focus in the song/s was on good qualities expected by the parents. And in the traditional time, the qualities would be, being a good farmers, prolific hunters (if they are men), then good manners, respect and hardworking in terms of farming (if they are women). Songs were educative in the sense that youths were taught of qualities they should adopt or adapt to as they grow into

adulthood. In fact, songs in African societies have a history as revealed by some scholars. Beach (1980) revealed that songs were part of the Great Zimbabwe traditional society since the tenth century when inhabitants settled in the south of Zimbabwe. The songs were relevant to different situations in people's daily lives. For example, Berliner (1981:21), cited by Chitando, said that traditional music included war songs, signal drumming, as well as music and dance for weddings, funerals and religious events.

In Gutu communities, songs are still a common feature when people perform different activities, be it when weeding, harvesting and trashing grain crops. It was a way of motivating and urging participants to forge ahead with work in a more determined manner. Thus, apart from the motivational role during work, it is correct to conclude that songs had different purposes in people's lives including imparting knowledge on different aspects of people's lives, including agriculture activities and conservation of natural resources.

3.8.5 Rituals

A ritual is a solemn ceremony consisting of a series of actions performed according to a prescribed order. While the ceremony procedures differ in Zimbabwe according to ethnic diversity, among Gutu communities, the ritual is commonly known as *mukwerera* (rain making ceremony). Gelfand (1959) explains that rain making ceremonies were conducted three times within a year that is in January, April and September. Explicit details from interviews conducted in Mashonaland Central, Zimbabwe are presented by Murimbika (2006) when he explained that rain making ceremonies were sacred rituals which were conducted at specified times during the course of the year. The first ceremony was carried out during the month of September or October and it was known as the thanks giving ceremony. The *Ishe* (chief) mobilised all the people in his chiefdom for the ceremony which was conducted in *rusvingo* (pole-built enclosure). The Chief lead the proceedings in which ritual beer offering and libations to ancestors were done at the ritual site. However, the chief would be getting guidance from the *Svikiro remvura/Nyusa* (rain making spirit medium). The ceremony was meant to thank the ancestors for the previous season's good harvests and to ask for a good rainy season.

The aftermaths of the ceremonies would usually be followed by heavy downpours, a sign taken to mean acceptance of the offerings by the ancestors. The second ceremony was conducted in the month of February. The procedures involved the chief taking the first new produce from the fields to be blessed by the *Svikiro remvura/Nyusa*. The last ceremony was conducted in April/May and people from *masabhuku* (kraal heads) were first mobilised to go and harvest the *Zunde raMambo* (chief's granary). Ritual beer was

then brewed using the new grain and offerings were conducted to thank the ancestors for the good harvests. Murimbika (2006) emphasised that women beyond childbearing age and girls below puberty participated in brewing the sacred beer. The rest of the other women would then brew beer consumed by the majority of the people. Murimbika (2006) also pointed out that the ceremony mainly involved elderly men in the procession who are expected to be sexually active whereas the elderly women should be beyond menopause and sexually inactive. The men should be “fertile” while women “clean”, it symbolised the outcome of a good and health product. The procession involves sexual songs and sexual imitative dances as a symbolic way of seducing the ancestors to release the rain (Jacobson-Widding, 1985).

While these were spiritual beliefs, they worked more often and as such became part of the societal beliefs which were treated as truths.

3.8.6 Community laws

The traditional leadership in each district is responsible for the upholding of the community laws. Information provided by the Gutu District Administrator’s Office in 2011 explained the traditional leadership hierarchy. The hierarchy has the Chiefs on the top, followed by the headmen, and then below are the village heads. The District Administrator (DA) is involved, mainly for administrative purposes. The duties are focused on the Chiefs’ welfare issues such as ensuring that they get their monthly allowances, vehicle requirements are provided and any other matters as delegated from the Local government Ministry. However, the Chiefs have their own reporting structure

which does not involve the DA. They submit their briefings to the President of the Chiefs' Council. In terms of duties, Chiefs, headmen and village heads are custodians of the community laws. The authority and jurisdiction is determined by the position of each leader. For example, Chiefs preside over a much bigger area comprising of several villages, building up into chieftdom. Gutu District has nine *Madzishe* (Chiefs) namely; Chitsa, Chimombe, Chiwara, Gutu, Makore, Munyaradzi, Munyikwa, Nyamandi and Serima. It also has eighteen *VanaSadunhu* (headmen), comprising of Chiriga, Denhere, Gadzingo, Jinjika, Mabotsa, Maburuse, Magombedze, Makumbe, Maungwa, Mupata, Mataruse, Mukaro, Mawere, Mutema, Mazuru, Ndahwi, Nemashakwe and Nerupiri. At the bottom of the traditional hierarchy, there are seven hundred and forty-five village heads, which could not be listed belisted here because of their large numbers. It was also clarified by the DA's office that the post-independence resettlement areas had no traditional leadership structures; instead, they have their own arrangements. For example, there are councilors and what is known as a committee of seven, comprising of the chairperson, Vice-Chairperson, Secretary, Vice-Secretary, Treasurer, and two Committee members (DA's Office, 2011).

In order to ensure the smooth running of life in communities, traditional leaders enforce compliance with the community laws. Where things go wrong, appropriate measures are taken and this follows the existing guiding rules.

The Minister of Local Government, Rural and Urban Development, honourable John Nkomo, citing the (Customary Law and Local Courts Act: Chapter 7:05) clarified the operations of community laws as guided by the Act. He stated that the Act was the legal

instrument employed in executing tasks by the local areas leadership. The Chiefs and headmen borrowed from the Act, the procedures with which they adjudicated civil cases at their local courts. The cases brought to the chief's court included border disputes, succession disputes, failure by community members to respect a designated *Zuva rechisi* (resting day) failure to attend to work in *Zunde raMambo* and any other disputes of a civil nature (Nkomo, 1998).

3.8.7 Dances

The Shona people of Zimbabwe had different traditional dances they engaged in, at different times of the year. Some of the known dances include: *Jerusarema/ Mbende*, *Muchongoyo* and *Ngororombe*, mostly performed in Mashonaland East and Central, Manicaland and Masvingo respectively. The *Muchongoyo* dance was a war dance, mostly performed in Manicaland (Chipinge), borrowed from Soshongane. Since *Muchongoyo*, also (common in Matabeleland), was a revolutionary dance, it was a sign of fighting external threats or perceived opponents. Mataga (2008) highlighted that some of these traditional dances symbolised fertility, sexuality and family. A good example is the *Jerusarema/ Mbende* dance which was performed at rain making and fertility ceremonies during different times of the year. However, of late, the dances are performed during celebrations and during funerals or merely to entertain the audience at recreational community gatherings. Among the Gutu communities, the popular dance is *Ngororombe*, mainly confined to Gutu East's Munyikwa and Muchekayaora areas. It is an entertainment dance, in which dancers make energetic dances punctuated by sexually suggestive styles. Even in schools, children are taught some of the dances as part of entertainment, though, from the skills acquired, some can even become

professional traditional dancers in future, *Hohodza*’ and *Inkululeko Yabatsha School of Arts*’(IYASA) in Zimbabwe are good examples of professional dancing groups.

3.9 Importance of indigenous knowledge

The application of IK in Gutu, is well represented by an agricultural case study in Chinyika village. The Chinyika Communities Development Project (CCDP), was introduced in 2005 by Paul Chidara Muchineripi. Having been born and grew up in the Gutu North area of Chitsa, Muchineripi devised a strategy to overcome food shortages in his area of birth. He liaised with the local communities so that they utilize indigenous grain crops for sustenance. The crops suit well to the Gutu climatic conditions characterised by low annual rainfall, averaging 400mm per year. Up to this day, the project has assisted the locals with reliable food supplies, nutritious food and a source of cash as they sell some of the grain crops (Muchineripi 2008).

The residents of Gutu district have embarked on Conservation agriculture. The project is driven by Oxfam, a non-governmental organization operating in different areas of Gutu district. It is a project meant to alleviate food shortages in the district through practising conservation agriculture, a cultivation method which relies on available resources such as mulching grass, local manure, crop residues and simple local tools such as the digging hoe (Oxfam Southern Africa Blog, 2010).

3.10 Intellectual Property law and Indigenous Knowledge

Zimbabwe enacted a number of intellectual property laws which are meant to acknowledge and protect the ownership rights of those deemed to be the brain child of

different types of originations, trademarks, patents, knowledge, skills and discoveries. However, there are a number of challenges when the same laws are to be applied in the protection of indigenous knowledge. The latter is enshrined in songs, proverbs, stories, folklores, community laws, common or collective property and inventions, practices and rituals. The knowledge is transmitted through specific cultural mechanisms like the ones listed above and often through designated community knowledge holders, who are the elderly members of the communities. Indigenous knowledge is considered collective to the community, and not private to any one individual or small group (Simeone, 2004). Because of the absence of distinct owners of the knowledge, it is difficult to protect the IK. For instance, the author-centered notion of copyright in intellectual property law makes it difficult to protect folkloric productions.

More so, the nature of indigenous communities may also prevent one from designating a particular person, group or even the owner as being the author in the modern sense. In addition to that, there seems to be problems of the age and the material form in which the knowledge is presented (Woodmansee *et al.* 1994: 1-15). One can even make reference to the manner in which IK issues are expressed, for example the statement, “*Vakuru vedu vekare vaiti....*” (Our great grandparents used to say...), the expression dates back to time immemorial and has no specific person to take credit. The same applies to folklores, proverbs and riddles; they cannot be credited to specific individuals. This lack of specific ownership of the knowledge makes it difficult to effect copyright regulations on IK.

Mukuka, (2010), citing from the Intellectual Property Rights Commission (IPR), had this to say:

Intellectual property rights are awarded by society through governments and mandated international bodies to individuals or companies over their creative endeavours evidenced in their inventions, literary and artistic works, musical performance, symbols, names, images and designs used for commerce. Intellectual property rights give the creator the exclusive right to prevent others from making unauthorised use of their property for a limited period. (IPR Commission: Online).

What can be deduced from the above expressed views is that when the property rights holding period expires, the work falls into the public domain and can be used freely by anyone. Looking at the patent rights regulations, Flint et al. (1989: 160); Jacob et al. (1993: 23), cited by Mukuka (2010: 6), explain that patents are intended, “to prevent others from making, selling, distributing, importing or using their invention, without licence or authorisation, for a fixed period of time” The patent holder is also expected to disclose in a manner that enables others to put it into practice. This creates problems, particularly with IK, since some of the explanations are personal and confidential, such that to bring in conventional laws may not help achieve the required benefits to IK.

Another aspect catered for under the intellectual property law is the issue of copyright. Whilst patents protect the idea or concept of an invention, copyright protects the material form in which the idea is expressed. In other words, copyright prevents unauthorised reproduction, recording, public performance, adaptation and translation of certain works, as defined in the Act, and allows for the collection of royalties for authorised use (Dean, 2001). Similar restrictions also apply to designs and trademarks (Lerner & Bresler, 2006). The IK restrictions are also noted by Battiste (2005) when she highlighted that, “a patent, a trademark, or a copyright cannot adequately protect a ceremony that

uses strikingly sacred-society symbolism to communicate empirical knowledge of medicinal plants.” The same also applies to most expressions of folklores, since they are not used in commerce as a means of identifying their source, it prevents them from being eligible for trademark protection. Over and above all, this lack of clear intellectual property rights protection of traditional knowledge contributes among other factors to the lack of openness in the sharing of IK locally, regionally and even at global level, much to the detriment of future generations.

3.11 Sharing of Indigenous Knowledge

The Sharing of knowledge involves the voluntary application and transfer from one or more person/s’ ideas, insights, solutions, experiences to another individual, either via an intermediary such as a computer-based system or directly (Turban, McLean, Wetherbe, 2004; Bouthiller and Shearer, 2002). If IK is not shared or transferred to future beneficiaries, there are dangers of the knowledge being lost forever through deaths of those who possess the unique knowledge. While in the old days, IK was shared through folklores, rituals, riddles, taboos, proverbs and many other mechanisms of an indigenous nature, things have drastically changed with the new social and economic developments such as westernisation and urbanisation. As such, Adam (2007) shares similar views with the above scholars when he expressed that information and communication technologies (ICTs) play major roles in improving the availability of indigenous knowledge systems and possibly make the knowledge blend with scientific and technical knowledge. The approach can also be applied to the Gutu IK community practices.

The communities in Gutu district have had in recent years, developments which are aimed at improving their lives through locally available resources. For instance, the Chinyika Communities Development Project (CCDP), Muchineripi (2008), the Ruti and Munjanganja dam irrigation schemes and conservation farming practices (Oxfam Southern Africa Blog, 2010). Conservation farming for example is being appreciated and implemented in most parts of the district's arid areas; and has helped in improving the locals' welfare in terms of food security. Apart from the fact that there are individuals in the communities who possess wide-ranging knowledge in terms of traditional medicine used in treating a variety of ailments, both for human beings and animals, knowledge of pest control and other crop diseases, intercropping, food preservation, home decorations, environmental conservation, soil classification, just to mention a few areas. There are a number of illustrations from other parts of Africa which highlight the usefulness of IK to the communities where the knowledge is used, the same way it is useful to the Gutu communities.

Herbs for example, are considered a primary ingredient in the treatment of ailments and are readily available to rural communities. The *Ieraka* (African potato), for instance is used to strengthen the immune system and to control high blood pressure, while the bitter aloe is used to cleanse blood of impurities and chewing of some tree barks prevents tooth decay. The Hoodia cactus leaves have been used for centuries by the San community in the Kalahari, chewing the leaves to suppress hunger during hunting expeditions (Kaniki and Mphahlele 2002:17) In Rwanda, farmers distinguish a great number of potato varieties by the properties of the seed potatoes and their culinary characteristics. The same applies with farmers in East Africa who distinguishes between

the taste, texture, storage time, marketing value and resistance to disease by various kinds of grain (Haugerrud and Collinson 1991: 5). In Zimbabwe, in the Southern parts of Matabeleland, Beitbridge area, the locals have adopted food preserving methods for the *Madora/Imbrasia Belina* (Mopani worms). They are preserved for future use by simply boiling them in water, sometimes adding salt, and then drying them in the sun. Similar methods are used in preserving *Mufushwa* (African vegetables). Many other indigenous communities are also skilled in brewing *doro rezviyo* (traditional beer) using grain crops. Now the question is how best can ICTs come into use to help in preserving and sharing of this valuable knowledge?

Since IK is tacit in nature, residing in individuals' minds and is shared through songs, folklores, dances, riddles, proverbs, taboos and many other ways, it is necessary to document the knowledge using ICT gadgets. Making reference to the use of modern ICT gadgets, Mutula (2002) explained the unprecedented growth of the mobile phone and how it has revolutionized access to information by the majority of people in sub-Saharan Africa. Since mobile phones have remarkably improved in terms of quality and capacity, the narrations by the elderly and other knowledgeable people can be captured using voice recorders or mobile phones in rural communities. The digital voice recorder can also be used to capture songs, folklores, riddles and taboos and many other IK facets. The latter two gadgets when fitted with appropriate software can facilitate the transmission of the information to other different platforms. The radio is another useful information transmission mode, which Mutula (2002) also identified as a dominant mass medium in sub-Saharan Africa. The eighteen radios per hundred inhabitants he estimated in 2002 have remarkably increased today because of the liberalised

economy in the region. Even televisions which are the other gadget are widely available in rural communities of Zimbabwe. The Internet can also be utilized through the creation of databases in which information can be stored and accessed whenever it is needed. The databases could be in the form of oral history narrative databases containing (videos, audio files, transcriptions of interviews from informants) just to mention those. Atwood (2009) also reiterated that technology is useful in capturing people's wisdom as that can be done verbatim. Other platforms for the capturing of IK are in the form of blogs, wikis and groupware (Laudon and laudon, 2007; Atwood, 2009 and Turban et al., 2008).

3.12 Traditional Knowledge and ICTs

The advent of colonialism brought about different and far reaching changes in people's lives on the African continent. In Zimbabwe in particular, there were changes in people's cultures, beliefs, values and traditions. People began to embrace the life styles of the white colonialists and this watered down the values of their indigenous knowledge systems. Nukunya (1975: 46) assessing the changes that took place in African societies due to outside influences had this to say:

Changes in communities in Africa can be traced directly or indirectly to factors originating from Islamic intrusion, colonial rule, Christianity, formal school education, and now economic conditions such as the introduction of cash crops and money-using economy.

While the developments were received differently, the period can be regarded as the coming of the era of modernity.

3.12.1 Colonialism

The process of one dominant power taking over control of another state and imposing its influence in every sphere of life can be regarded as colonialism. Colonialism in Africa was mainly by European powers taking over control of some African states. Zimbabwe for instance was colonised by the British in 1890 and that marked the beginning of far reaching changes which affected the indigenous ways of life. Kahari (1977) when analyzing the effects of Missionaries on Literature writing in Zimbabwe likened Missionaries to Christian soldiers whose intention was to convert the pagans to Christianity. He went on to explain that Africans were first taught reading, writing and arithmetic, thereafter they were then taught the “word of God”. The teachings of Christian education shook institutions to their foundations, leading Africans to despise their own ways of life, and adopting Western life styles. Kahari (1977: 87-88) cited as examples, how people who migrated to urban areas adopted individualism as opposed to family unit, how they changed in terms of tastes, preferring bottled beer as opposed to the traditional brew, adopting Western dances as opposed to their traditional *Mbende/Jerusarema*, *Muchongoyo* and *Ngororombe* dances. Similar resentments to own life styles by Africans were also highlighted by Chavhunduka (1977:36) when he explained about the strong opposition missionaries had towards traditional medical practice. This indoctrination affected even the converted as is evidenced by the utterances by one Evangelist converted to the Methodist Church and agreeing to participate in a family ritual involving a traditional healer (*n’anga*). He said that:

I am not really interested in this n'anga business, but I am just agreeing to the whole thing for the sake of my kinsmen. I am just trying to please them because they think that traditional medicines really work (Chavhunduka 1977: 36).

The same sentiments of despising IK practices by Africans themselves, characterised other areas of their lives such as overlooking the cultivation of traditional crops like the small grain crops (finger millet, sorghum and pearl millet), preferring the maize crop.

3.12.2 Urbanisation

The advent of colonisation brought about the development of cities and towns, which came to be known as urbanisation. People from rural areas began to migrate to the cities in search for jobs and better lives. The new city life style was different from what people were used to in the rural communities. People meeting had different backgrounds, with others being foreign to Zimbabwe, and this resulted in the cross pollination of cultures. That way beliefs, customs and values began to change. More so with the introduction of the television station in Zimbabwe in 1960, this also meant more exposure to the white people's way of life, thus making Africans to embrace some of the lifestyles. Other push factors to urban migration were, according to O'Connor (1983) the pervasive drought and famine in some parts of Africa which permanently pushed the poor off their land into town. Others also cited rural poverty and conflict as driving rural communities out of their land to urban areas (Bryceson and Potts, 2006).

3.12.3 Globalization

If one talks of processes connected with increased speed of communication, movement of goods and people from one part of the world to another and all this depending on world wide-linkages, then that can be understood as globalisation (Dilley, 2004). Other than the socio-economic and political gains of the linkages, there have been factors to the contrary. Khor (2000) argues that while there are export and income gains for developing countries, there are also economic losses and social dislocation due to liberalisation measures which lead to inequalities in terms of wealth. Having said that, it thus becomes necessary that rural communities, where valuable IK may be found, should be effectively integrated into the mainstream knowledge in which information can be shared where it is applicable.

3.13 Government measures to save the environment

The world over, governments have a responsibility to put in place measures that ensure the protection of the environment from various forms of danger, be it the indiscriminate cutting down of trees, burning of the grass, pollution of the environment, defacing the environment and many other harmful destructions. Garlauskas, (1975) and Petak 1980, 1981; Bowonder' 1987), defines environmental management as a process that emphasise the application of science to specific environmental problems under the auspices of the state. However, the task of managing the environment would also involve other players such as non-state managers and the 'non-professional" and "non-scientific" players.

3.13.1 Environmental Management Agency (EMA)

The Environmental Management Agency (EMA) of Zimbabwe is a statutory body which was established in terms of the Environmental Management Act [Chapter 20:27] of 2002.

The agency was established to ensure sustainable utilisation and protection of Zimbabwe's environmental goods and services. EMA is a hybrid organization where the former Department of Natural Resources was merged with the Water Pollution Control Unit from the Zimbabwe National Water Authority, the Air Pollution Control Unit and the Hazardous Substances Control Unit, both from the Ministry of Health and Child Welfare. It became fully operational in January 2007 and it derives its mandate from the Environmental Management Act (Chapter 20:27).

EMA strives to protect the environment with people in mind making sure that there is a clean and healthy environment (Herald Newspaper, 29 June 2011). EMA's stakeholders include industrialists, farmers, NGOs, miners, government departments, parastatals, traditional leaders, law enforcement agencies, the judiciary, school children, individuals and all other citizens. These stakeholders represent the entire societal and economic spectrum of the country and EMA ensures that all stakeholder concerns are considered as this is one of the principles of the Environmental Management Act (Chapter 20:27). According to the EMA Act, its statutes of ensuring a safe and habitable environment should be ensured at all times.

3.13.2 National Tree Planting Day

Zimbabwe's National Tree Planting Day (NTPD) was introduced in 1980 by the then Prime Minister of the country, Robert Gabriel Mugabe. From then, Zimbabwe commemorates the day by planting hundreds of trees annually on the first Saturday of the month of December. The President of the country leads in the national tree planting event by planting a variety of indigenous trees. The latter are prioritized because some of the trees are becoming extinct due to wide usage in households. In Zimbabwe for example, of late communities in all cities have become leading consumers of firewood as a result of the country wide power shortages. Firewood constitutes 49% of the total energy used in Zimbabwe, with over 90% of households depending on wood for energy. Recent studies have shown that on average, a household in Zimbabwe uses approximately 7.7 cubic metres of wood per year for domestic purposes (National Forestry Commission, 2011). People in rural and semi-rural areas depend on forests for wood used for cooking, heating, building and carving, whilst commercial farms use wood for tobacco curing and often clear land of trees for farming (National Forestry Commission, 2011). Due to the ever increasing demand for firewood, the NTPD in

Zimbabwe is a welcome national event aimed at averting desertification in the country. While the national tree planting day is a one day national event, hundreds of thousands new trees are planted throughout the country and this goes a long way in replacing the ones cut down through domestic use.

3.14 Indigenous Knowledge Retention Strategies

The tacit nature of indigenous knowledge means that it is knowledge hinged on the memory of those who possess it. The fact that there is a danger of completely losing the knowledge through deaths of the gatekeepers (elders), means that steps should be formally taken to document and preserve these valuable oral narrations. Because of the practical dangers of IK extinction, Warren, (1992) noted that, “the future of IK that reflects many generations of experience and problem solving by thousands of ethnic groups across the globe is uncertain”. The situation is worsened by the rapid changes happening in communal life where the young generations are adopting and adapting to new influences of modern technology and education (Ulluwishewa, 1993). Therefore, the preservation strategies to be adopted are many and diverse, but in this discussion, focus would specifically be on the strategies below.

3.14.1 Indigenous knowledge Resource Centres

The establishment of national centres which can be natured into repositories of indigenous knowledge systems can go a long way in fostering the retention of the future generations’ heritage. By way of definition, National Indigenous Knowledge Resource Centres (NIKRCs) are organizational structures through which indigenous knowledge is recorded, stored, screened for potential economic uses at national level, and distributed to other centres in appropriate ways (Juma & Posey, 1989). The national centres serve as vehicles to introduce IK components into the formal curricula from primary school through the university as well as in the extension training institutes.

Ruddle, (1991); Ruddle and Chesterfield, (1977) argue that the strategy can help to augment the declining capacity of the traditional means of transmission of IK due to universal primary education prevalent in most independent states across the African continent. The NIKRCs would also act as inventories of knowledge that can be of primary help in development focusing on:

- Indigenous crop pest management systems;
- Farmers perception of positive and negative characteristics of crop varieties;
- Indigenous approaches to the management of soils, water and biodiversity resources;
- Categorize existing indigenous structures and functions suitable for each and every rural community.

All the above roles will help strengthen the capacity of the much bigger society and greatly facilitate sustainable approaches to development (Warren 1992b; Atte 1992).

3.14.2 Development Partners

The exploitation of rural communities usually happens out of ignorance on how best local people can utilize the potential of their IKSs for the improvement of life in communities. From the South African scenario there was the First National workshop on the Indigenous Knowledge Systems (IKSs) in 1998. The conference identified its key stakeholders as involving IKS practitioners, Universities, Science councils, government, business and industry. The information provided in (table 3.1) helps to show how IK and other disciplines can work together to promote development in society through

partnerships that promote the usage of IK. See table 3.1:

Table 3-1: Key stakeholders in promoting IKSs utilisation

Stakeholder	Interest	Objective	Action
IKS practitioners	Empowerment	Protection, promotion and validation of IKSs; partnership in knowledge creation; equity	Create forums
Universities	Centres of excellence	Human resource development; knowledge creation	Interdisciplinary student-based field research
Science councils	Innovation	Promotion of IKSs; knowledge creation	Collaborative consortia
Government	Regulatory frame-work	Protection and promotion of innovation	Policy formulation; enabling legislation
Business and industry	Marketable products	Wealth creation	Sponsorship and collaboration

Table 3.1: Adapted from Rhode Hechter (SCECSAL 2002) Source: (IKSP 1987:7)

3.14.3 Community Empowerment

Local communities should be given more control over the management of their unique IKSs since they have several years of familiarization with the knowledge, something which has a track record. With globalization, it is feared that rural communities may be exposed or subjected to unfair exploitation of their local resources at the expense of their own welfare Gorjestaini, (2000). The empowerment move can be locally driven (community to community) sharing of skills or it could be the government coming in to boost the rural communities to prosper from community resources.

Gorjestani, (2000:6) cited an example from South Africa on how communities could empower one another. Below is an extract highlighting the developments:

The Rooibos tea-growing farmers of Wupperthal in the Western Cape Province were successfully exporting their tea to Europe. An NGO, EMG thought that other tea-growing communities could benefit from their experience. In June 2000, over a dozen smallholder Rooibos tea-growing farmers of Suid Bokkeveld visited their neighbours for discussions on crop quality, processing and marketing. The outcome: the visiting farmers went back to their communities, shared what they had learned, set up a farmers' co-operative, improved their post-harvest processing and secured a \$15,000 order from a European importer.

The lesson from the case study is that of the community to community sharing of knowledge, thus empowering fellow members for much bigger benefits. Mutula, (2000), citing from cases across the African continent, highlighted the government recognition of indigenous knowledge systems. In Zambia, the Traditional Health Practitioners Association (THPA) is recognised by government. In Zimbabwe, there is the Zimbabwe National Traditional Healers Association (ZINATHA), Bodeker et al., (2000). In 1995, the Nigerian government officially integrated traditional healers into the state-run national health. Today, two-thirds of the health care practitioners are traditional healers (Annon, 2001b). The Ethiopian Ministry of Health recognises the importance of medical plants and traditional health systems (Annon, 2001a). More examples were also noted by Mutula (2000), like the case of Kenya where the government formulated a development strategy, the District Focus for Rural Development, mobilising initiatives that recognise

community involvement in development. Through the strategy, communities are encouraged to participate in decision making regarding development priorities in their regions. Similarly, agriculture extension services have been encouraged to link government and grass-root communities, a scenario which allows communal farmers to provide their farming experiences, which in turn is translated into tangible practical demonstrations by extension workers. Today, Kenya has in existence, the Centre for Indigenous Knowledge Systems and Agriculture By-Products (CIKSAP) which encourages indigenous health care-based knowledge (Boderker et al., 2000).

3.14.4 Benefit Driven Approach

The documentation of knowledge is one way of gaining control over community resources. The case of patent, trademarks and copyright regulations come into mind. For example, the *Hoodia* (appetite-suppressant agent), which the Khoisan claimed ownership of, was eventually settled when the Khoisan groups in Southern Africa were granted ownership rights in 1997 (South Africa) and 1999 (Namibia), (WIMSA 2003/2004). Today, the San people enjoy a monetary benefit of R24 per dried kilogram of *Hoodia* exported, Channells (2007:12). The property rights enforcements helped in guarding against the exploitation of IK by the industrialized countries, Shiva (2006).

3.14.5 Customary law

Local communities should be flexible enough to develop distinct values, laws and practices that would ensure that their knowledge is passed on for the benefit of future generations. A good example is that of Muchineripi, (2008) and his Chinyika Community Development Project (CCDP), building the idea of intensively growing the finger millet crop for food security and monetary benefits in Gutu. The project can go a long way in

averting hunger in Gutu rural communities, and as such the values and practices of the project should be upheld and transmitted for posterity. Rural communities can also, under the Customary Law and Local Courts Act (Chapter 7:05), have local laws passed by the chiefs and headmen to safeguard resources in their areas against exploitation which may lead to extinction. This could be applied in the protection of indigenous tree species as is the case in Chipinge district, south east of Zimbabwe, where local laws prohibit the cutting down of the specified indigenous trees (Rusinga and Maposa, 2010).

3.15 Summary

Chapter three reviewed literature relating to the various roles played by Indigenous Knowledge (IK) in the areas of agriculture and environmental conservation in rural communities. There was a major focus on the nature of IK in rural communities in general and Gutu district in particular. The IK in agriculture looked at cultivation methods and crops grown. There was focus on some of the indigenous farming practices such as rotational farming, intercropping, conservation farming, grain crops grown, and preservation methods. Other indigenous practices such rainmaking ceremonies and its associated rituals were discussed since it was part of the communities' strong beliefs to secure good harvests and having stable environments with good vegetation. In terms of maintaining the environment, there was focus was on the use of taboos, proverbs, rituals, community leadership laws and government measures for the safeguarding of water sources, wildlife and tree species for a balanced ecosystem. The review also looked at the community's elderly people some of whom are sources of IK since they boast of years of familiarization with the environment.

The mechanisms of sharing the knowledge and how it is retained were also examined. The use of inferences from case studies across the globe were provided since IK is peculiar to different geographical set ups. The next chapter describes the methodological framework that was used in the collection of data from the rural Gutu case study.

CHAPTER FOUR

4 RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

The chapter focuses on the study procedures used, particularly the research processes and methodology used in gathering of data in order to answer the research questions. The chapter explains the target population and gives a description of the sampling techniques used. The aspects of reliability and validity are also discussed. The same was done with ethical considerations, whereby the procedures used in data collection put a lot of emphasis on upholding privacy and confidentiality where necessary like when individuals are not comfortable with the exposure of their identities. All the above stated guidelines should help in facilitating the assessment of the role of indigenous knowledge in agriculture and environmental conservation in many other parts of the country which share similar conditions to those in Gutu district.

The researcher used a survey research design as the data gathering mechanism. The method as the names suggest, involves a careful sampling of respondents from a population too large to observe directly (Babbie, 2010). Through the use of a survey, the researcher collected some descriptive information whose characteristics may be taken to reflect those of the larger population (Babbie, 2010; Stangor, 2011). The process of collecting data, involves the gathering and synthesizing of information from experiences of specialists, practitioners and members with long durations of stay in their

communities (Powell, 1985). The other consideration was the community members' prolonged familiarity with their surroundings. That advantage is suitable for studying Gutu district, which is a rural community, comprising people with different knowledge levels of their respective areas and even beyond. The majority of the informants were born and bred in different parts of Gutu district, hence knowledgeable of their localities. Therefore, in terms Knowledge of the the localities, the residents are reliable informants of the indigenous practices in Gutu district.

4.2 The background of Gutu district

Gutu district is the most northerly district in the southern province of Masvingo, Zimbabwe. The weather in Gutu district is hot and dry throughout most of the year and prone to drought with some of the lowest rainfall in the country, usually 400-600ml per year. The district is divided into five distinct settlement demarcations, namely; the old resettled area, newly resettled area, small scale farmers, communal and urban areas. The resettlement areas cover a total of 369 744 hectares of land (Agriculture, Technical and Extension Services Department, Gutu, 2011). Gutu district has a total population of 213 263, with an annual growth rate of 1.01 percent (Zimbabwe Statistics Office, 2002).

Maize is the staple crop in Masvingo, but good harvests require high amounts of rainfall. Low rainfall makes the province ill-suited to the growing of maize. As observed by Muchineripi, (2008), commercial agriculture help to economic growth in Zimbabwe, but the dry climate in Masvingo is not suitable for large scale agriculture. This is why food shortages are common. While there are irrigation schemes at Munjanganja and Ruti dams, these are on a small scale. There are no mining or manufacturing

companies in Gutu district. Subsistence farming is the only dominant source of livelihood, supported by the rearing of few domestic animals such as cattle, sheep and goats as well as chickens.

Gutu communities rely on firewood for cooking and warming of the houses. With the ever-increasing population, forests have been intensively and extensively destroyed. The limited land space is contributing to overgrazing and generally the terrain is barren. While the government has introduced rural electrification in Gutu district, this has mainly benefitted business centres situated along the main roads linking Gutu Growth point. This leaves the rest of rural communities without electricity; hence firewood is their main source of energy.

Gutu district was chosen as the study area because of the historical developments which build up to the present situation. Colonial agricultural policy stifled the production of indigenous crops in Zimbabwe. This began in the late 1920s when there was a steady shift away from the growing of indigenous crops to the production of commercial or “cash crops”. Subsidies and agricultural support services were targeted at large commercial farms. Government owned Grain Marketing Boards (GMB) controlled the purchase and sale of all agricultural commodities, creating an effective monopoly of markets for maize, cotton, sunflower and tobacco (Stoneman, 1981; Amin, 1998). This was due to the demand from world markets and urban centres, as well as an agricultural economy providing revenue to support the development of manufacturing industries, thus boosting the urban industrial economy.

Another contributory factor to Gutu's poverty stricken state is that prior to 1951, the year which saw the introduction of the Land Husbandry Act (LHA), rural communities in Gutu used to practice a rotational method of farming. A piece of land would be cleared, grow crops for several years until the soil became depleted, then move to a fresh plot for the next harvest. This allowed the soil to recover its nutrients and vegetation. However, colonial policies disrupted the practice. The creation of native reserves under the Land apportionment Act (LAA: 1930) increased the population density in Gutu rural areas. Household farming plots were reduced to between two and six acres. Overcrowding in native reserves led to over-cultivation and soil erosion (Cabral and Scoones, 2006). The growing of maize amidst the low rainfall in Gutu, lack of fertilisers to replenish nutrients in the soil, made the maize harvests highly volatile. Thus, the combination of smaller plots and adverse climatic conditions for the growing of maize in Gutu district has created a situation where many of the rural communities now consume more food than they produce. Subsistence farming has become the mode of agriculture in Gutu.

4.3 Study methodology

The study is premised on a set of research questions, data collection methods and justification of the methods as presented in table (4.1) on the following page:

Table 4.1: Summary of research questions, data gathering methods and Justification of methods

Research question	Data collection methods	Justification for the data collection methods
(a) Which indigenous practices are still used by Gutu communities in agriculture and environmental conservation?	Focus group discussions Observations and transect walks	Extensive and corroborated views Establish happenings on the ground
(b) What are the challenges faced by Gutu residents in utilizing indigenous knowledge to promote sustainable agriculture and environmental conservation?	Focus group discussions Observations and transect walks	Cross-sectional and extensive suggestions Establish happenings on the ground
(c) What are the constraints encountered by Gutu communities in the sharing, preservation, transferring and retention of indigenous knowledge?	Face-to-face interviews Focus group discussions Observations	Individuals can confide when the environment is conducive Wide views which may be corroborated Establish if there is tangible evidence on the ground
(d) What measures can be adopted by Gutu residents to make indigenous knowledge appreciated and utilized in agriculture and the conservation of the environment?	Focus group discussions Content analysis Observations	Participants suggested measures Borrowing ideas from similar case studies Reflect on what is already in existence

The researcher chose the survey methodology on the basis that it was premised on purposive sampling of the informants. The targeted informants in Gutu district comprised of chiefs, headmen, community elders, traditional healers, midwives, successful farmers, leaders of resettlement areas and other knowledgeable members in the communities. The selected informants are rich in knowledge with experience acquired through different means, such as oral testimonies passed down from one generation to the other (Vansina, 1985:27).

Some of the Gutu community elders expressed valuable knowledge in different areas of specialization such as farming, animal rearing, health care, food preservation, upholding of taboos, use of proverbs and riddles, conducting of rituals and ceremonies among a chain of other useful local practices. The survey method provides an advantage of allowing the researcher to sample informants. According to Stangor, (2011), sampling involves the selection of people to participate in a research project, with the goal of being able to use the participants to make inferences about a larger group of individuals. Thus, the researcher saved on time and money but without sacrificing on efficiency, accuracy and adequacy of information required by the research process.

The survey has its weaknesses such as the selective revealing of information by knowledgeable informants, especially where they feel that the information offers them a competitive advantage. A Survey focuses on a representative sample, with chances of leaving out other knowledgeable informants. As such, the informants are expected to be as detailed as is possible on issues being asked about; otherwise, information provided may not be adequate.

Surveys have disadvantages in that when individuals fail to comprehend the reason for being interviewed they may refuse to divulge information. The targeted informants may also want to know who else has been interviewed and why they are being chosen. The interviewees may further want to know whether the local authorities have granted permission for the interviews to be conducted. To overcome the challenges where by potential informants might have reservations to be interviewed, the researcher used two

approaches. The first one was that of following the laid down procedures of going through the leadership hierarchies, starting by securing clearance from the Gutu District Administrator's office, then to chiefs, headmen and village heads.

In turn, the leaders became the researcher's points of reference to some well selected informants throughout the district. The second method was that of highlighting the reasons for undertaking the research and why people should freely participate. The researcher explained that the benefits are intended for their areas and themselves as residents. The assurances assisted by making knowledgeable informants to open up with information. Assurances further helped in allaying fears by informants who might have feared political victimization or reprimand from their local leadership for entertaining "strangers" without their consent.

4.4 Qualitative Research Methods

The study employed the quantitative data collection method. The qualitative method is mainly suitable for the collection of data through interviews and observation of participants' activities as was the case with Gutu residents. Such a holistic approach helps in catering for the weaknesses of one method over the other. The researcher employed oral interviews, involving 100 respondents from a cross section of the communities in Gutu district. The selected interviewees went through some in-depth face-to-face interviews conducted with eight chiefs and nine headmen, as well as the representatives of three resettlement areas in the district. Also included in the data collection process were 12 focus group discussions. The focus group discussions were lasting forty-five minutes to one hour each. In order to reinforce the study findings, the

researcher carried out transects walks and in the process made observations to verify on what interviewees explained as the prevailing situation in their areas.

4.5 Triangulation

Triangulation is broadly defined by Denzin, (1978:291) as “the combination of methodologies in the study of the same phenomena”. This means the application of different methods in data collection from its sources. The approach of varying data collection instruments helps the researcher to understand problematic issues from diverse angles. Creswell & Clark, (2006) argue that by triangulating data collection instruments, it helps the researcher to make an objective assessment of data. When a researcher employs various data collection instruments, the approach brings out holistic results mainly because consistency or variations can be picked from the data analysis (Creswell, 2003:19).

According to the Neuman, (2006), there are four basic types of triangulation. The first one is the investigator triangulation, it consists of using multiple, rather than single observers. This means that the more numbers corroborating on a point of view, the more it is viewed as reality and vice-versa. The second one is the theory triangulation; it consists of using more than one theoretical scheme in the interpretation of a phenomenon. Yet another one is the methodological approach and it involves the interchanging of more than one method for the validation of results. Last though not least is the multiple triangulation approach. It is whereby the researcher combines in one investigation multiple observers, theoretical perspectives, sources of data and methodologies. These mixed data collection instruments augment one another and it helps to strengthen the research findings.

This study triangulated the responses from individual interviews, focus group discussions, observations aided by transect walks. The approach was aimed at improving the reliability and validity of the findings.

The study combined the use of face-to-face interviews, focus group discussions, observations; transect walks and content analysis in order to find out the indigenous practices which are common in agriculture and the conservation of the environment in the Gutu district. Both the qualitative and quantitative approaches were applied in data gathering and the interpretation of views and opinions. The study also compared responses from interviewees who participated in in-depth oral interviews and those from focus group discussions. The multi-faceted approaches helped in drawing up well deduced findings so that sound conclusions are drawn on the state of indigenous practices in agriculture and the conservation of the environment in Gutu district.

4.6 Surveys

Surveys are a form descriptive and quantitative research which involves the acquiring of information about one or more groups of people under study. Usually, focus is on people's characteristics, opinions, attitudes or previous experiences and these are acquired through the use of questions and tabulated answers (Leedy & Ormrod, 2010).

The survey study is suitable for social research whose aim is to collect original data from the informants and use it for descriptive purposes (Stangor, 2011).

Survey research comprises of a cross-sectional design in which data are collected predominantly by questionnaire or structured interviews involving a number of cases (Bryman, 2004: 43). Surveys are effective in that they employ the use of more than one

research method in a bid to detect patterns of association (Barbie, 2007). In this study, information was gathered from the interviewees through face-to-face interviews, focus group discussions, observations, transect walks and content analysis. Leedy & Ormrod, (2010), explain that survey research gather data about participants' opinions, attitudes and behaviours at a particular moment. The survey methods was suitable in Gutu district since it was not possible to deal with the whole population of 213 263, with an annual growth rate of 1.01 percent (Zimbabwe Statistics Office, 2002). Due to the limited time for the research, conducting a survey was the best way of gathering data for the study.

4.7 Research Design

Nachmias & Nachmias, (1996: 29) explain a research guide as a programme that guide the investigator in the process of collecting, analyzing and interpreting observations. The research design provides proof to the researcher to draw inferences or to use obtained interpretations for generalization to a larger population or to different situations. Similarly, (Ngulube, 2009) explains that a research design guides the researcher in collecting, analyzing and interpreting data, giving it meaning. Carriger, (2000: 1) is of the view that a research design is the strategy, the plan and the structure of conducting a research. In simple terms, this is to do with the how to conduct research, indicating who or what is involved and where and when the study would take place. The researcher utilized the narrative research design to collect different views from the respondents. The narratives were on the views of residents on the use of indigenous knowledge in agricultural and the manner in which people interact with the

environment in their surroundings. Bryman, (2004:412), sums up the narrative design as entailing sensitivity to:

the connections in people's accounts of the past, present and future events and states of affairs; people's sense of their place within those events and the stories they generate about them; and the significance of context for the unfolding events and people's sense of their role within them.

Through the use of oral interviews, the researcher chose the narrative research design in order to allow the respondents to freely express their views, opinions, behaviour, feelings and judgments on what they thought was the role of indigenous knowledge in agriculture and the conservation of the environment in Gutu district.

Soon after the research proposal was accepted by the UFH Higher Degrees and Research Committee, I began preparations for data collection. I prepared the data collection tools/instruments such as the interview guide, focus group discussion guide, observation and transect walks guides. I went into the field for four months, gathering data from mid-April up to mid-August 2011. A total of 100 informants were purposively selected. The list included chiefs and headmen, successful farmers, leaders of resettlement areas, traditional healers and herbalists, traditional midwives and other community members (See table 4.2). I followed the laid down procedures in dealing with community members as the informants. The procedures involved, first getting clearance from the District Administrator's office, thereafter, I secured clearance from chiefs and headmen in order to be allowed audience with respondents in areas under their jurisdictions. With permission from the Chiefs and headmen, village heads in turn allowed me audience with members in their villages. The oral interviews targeted 100

interviewees from purposively selected participants (see table 4.2) and each interview took 45 minutes to 1 hour. I had to be courteous in order to get informants to participate in the oral interviews since they were busy with different activities in the communities. The process was hectic as it involved intense travelling around the district, interviewing the selected participants. I also ensured that the procedure of getting appropriate informants was easier by going through community leaders who assisted by facilitating audience with knowledgeable informants.

The informants' narrations were recorded using a voice recorder and transcriptions were done at a later stage. The researcher also interchangeably conducted some focus group discussions as a way of validating or consolidating some views, opinions, and observations from individual informants. In analyzing data, the researcher mainly used the qualitative approach, whereby, interviewees' information was categorized into various themes, which were analyzed and interpreted for findings. Part of the data was analyzed quantitatively; it was first coded and then analyzed using the statistical package for social sciences (SPSS) version 20. The various sets of data gathered through interviews, focus group discussions, observations and transect walks are presented, interpreted, and analyzed in chapter five.

In conducting the study, the researcher felt that there is need to highlight two important aspects of the research process, namely the research design and the research methodology since they form a crucial area of this study. According to Bryman, (2004), a research design is a framework for the collection and analysis of data, specifically focusing on areas which are prioritized, like interviewing informants in order to use their views and opinions to arrive at conclusions. Sharing similar opinions is Stangor (2011)

who refers to a research design as specific method/s a researcher uses to collect, analyze and interpret data.

Yet another view is that, a research methodology, involves processes, tools and procedures involved in research (Barbie and Mouton, 2001). In a way, research methodology focuses on the framework within which research is conducted, that is the preliminaries of research, data gathering instruments used as well as how the data collection process is done on the ground. The clarity is necessary in this study since processes and procedures were involved, emanating from the fact that there are laid down government procedures in Zimbabwe when a researcher needs to have access to community members for their views and opinions. More so, there are political factors, whereby incumbent members of parliament for the areas under study were interested in knowing the nature of the research, either to ensure that no rivalries 'misinforms' people on political matters, with issues arising from the research or that the politicians may want to benefit by gaining political mileage from the findings, especially if they are positive.

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4.8 Study Population

The study focused on the entire population of Gutu district. Bryman, (2004) explains a population as the universe of units from which a sample is to be selected. Population can also refer to the entire group of people that the researcher desires to learn about (Stangor, 2011:110). Others like Remler & Van Ryzin, (2011) view a study population as the population on which the study aims to investigate. Yet another scholar, Gay (1981) describes the term population as a group of interest to the researcher, of which there is an intention to generalize the findings/results. This study covered the whole of Gutu

district, particularly the five areas in which the district is demarcated (see chapter one for details). The land demarcations helped in bringing out a cross-section of views on indigenous practices in agriculture and the conservation of the environment in different areas in Gutu district.

The researcher employed a representative sample in order to make sure that the findings of the study are representative of the entire Gutu district population. Stangor, (2011:110) refers to a representative sample as one that is approximately the same as the population in every important respect. In line with the aforesaid, the study focused on the whole of Gutu district as a case study. However, since the study employed a survey approach, interviewees were purposively selected (sampled) so that the information gathered could be generalized to the entire population.

4.9 Study Sample

Bryman, (2004:543) defines a sample as a segment of the population that is selected for research. In this study, the sample was chosen from the entire Gutu communities. The target population comprised of 100 respondents which were purposively selected and were found to be appropriate for the information required for the study. For details, see (table 4.2) on the next page:

Table 4.2: Sample of the study population

Designation of informants	Number of targeted informants
Chiefs	9
Headmen	12
Village elders (over 80 years)	10
Prominent farmers	15
Traditional healers/herbalists	10
Traditional midwives	7
Agricultural extension officers	6
Veterinary assistant officers	4
Leaders of resettlement areas	5
Other Community members	22

The sampled informants were arrived at through a preliminary survey of Gutu district, along its five demarcated settlement structures (highlighted in chapter one). The interviewees were sampled purposively so that only those informants who could advance the purpose of the study were chosen, see (table 4.2) above.

The selection criterion was based on a number of considerations which were in line with the study. The chiefs and headmen were chosen from communities falling under semi- arid and arid areas, which constitute the greater area of Gutu district. The study also included resettlement areas (these are areas where few people were resettled in order to decongest communal areas), they enjoy reliable rainfall and achieve

good crop harvests. As for the village elders, these were chosen on the basis of their ages and duration of stay in their areas of residence. The rest of other informants were part of the community members chosen through the snowballing process. The selection criterion was done in line with sample expectations which Stangor, (2011) explains as involving smaller groups of people who actually participate in the research. The chiefs and headmen were selected on the merit that they are custodians and enforcers of communal laws in the areas falling under their jurisdiction. Thus as custodians of traditional customs, values and beliefs, chiefs are regarded as enforcers of indigenous practices in communities. Furthermore, chiefs and headmen provided useful insights into the nature of indigenous practices that communities should practice and the reasons for following the practices. As for the inclusion of traditional healers, herbalist and midwives, it was aimed at gaining information on their use and preservation methods of medicinal plants.

Discussions with traditional healers, midwives and herbalists looked at how they use the environment to get their medication and the effects they suffer from due to the destruction of the environment. Prominent farmers were chosen for their farming knowledge, particularly the crops grown, farming methods, timing of planting, crop rotation, harvesting and preservation of the crops. Agriculture and Extension Officers and Veterinary assistants were chosen for their scientific knowledge on crop management and animal treatment in light of IK as alternatives. Other community members with knowledge on diverse areas were included so that as much information on indigenous practices in agriculture and environmental conservation was recorded. In

resettlement areas, leaders of the settlement committees were selected to provide information on the reasons for the good harvests unlike the greater parts of Gutu district. Barbie, (2007:184) highlights the logic and appropriateness of selecting a sample on the basis of knowledge of the population or its elements, and referred to it as purposive sampling. Purposive sampling is the choosing of people who have unique perspectives or occupy important roles, or selecting individuals or artifacts to represent theoretical categories or considerations (Patton, 2002).

The use of purposive sampling as a data gathering method may have possible bias of leaving out potential informants. The weakness was overcome through the engagement of 22 ordinary members from across the district. The 22 participants were selected through snowballing sampling. The researcher was referred to the individuals by those who knew about the knowledge they possessed.

The surveyed areas covered eight chiefs and twelve headmen, as well as three resettlement areas in Gutu district. One chief could not be accessed due to reasons beyond the researcher's means. Gutu district has a total of 9 Chiefs and 18 headmen, but 12 headmen were chosen purposively considering that areas which shared boundaries had common IK practices as communities under the same climatic and environmental conditions.

4.10 Data Collection Instruments

The study employed a number of data collection instruments such as face-to-face interviews, focus group discussions, observations which were supported by transect

walks.

4.10.1 Interviews

The study involved the conducting of face-to-face interviews with selected informants across Gutu communities. The first interviewees were chiefs and headmen who were purposively selected. Chiefs and headmen being the custodians of traditional indigenous practices and the laws governing communities provided information on how they govern communities in terms of laws enforcing the respect of IK. In order to interview the chiefs and headmen, the researcher followed the traditional procedure of paying a token fee required for one to be allowed audience with the chief or headman. Similarly, other interviewees were purposively selected on different merits as earlier outline. The groups included prominent farmers, traditional healers and herbalists, traditional midwives, leaders of resettlement areas, agriculture and extension officers, veterinary assistant officers and others in the communities knowledgeable in IK. All the interviewees agreed to have the interviews recorded using a voice recorder and these were later transcribed.

Where interviews involve the use of data gathering instruments, they are generally conducted with lower numbers, compared to cases in which questionnaire surveys are used. Respondents who were involved in the interviews were chosen on the merit that they have special knowledge on the subject under discussion or that they have unique insight on IK. The other reason is determined by the position held by individuals in society. Chiefs for example are the custodians of community laws and their authority is recognized in the community (Denscombe, 1998:118). The merits considered in choosing respondents have been explained earlier on under the study sample. The respondents made significant contributions in their individual capacities through unique

insights on indigenous practices in their communities. The interviews involved the expression of experiences, views, opinions, and comments. The individual sentiments helped in highlighting the nature of indigenous practices, especially those to do with knowledge sharing, transferring and preservation in order to benefit agriculture and the environment in Gutu district. The shared knowledge would possibly be applied to other areas in Zimbabwe with similar conditions to those in Gutu district. The researcher appreciates the role played by snowballing sampling. The process of snowballing is a chain sampling, whereby interviewees are asked to refer people they know to the researcher for inclusion in the sample (Remler & Van Ryzin, 2011: 156).

On the other hand, Bryman (2004) explained the snowballing technique as a process whereby familiarity with one individual creates an opportunity to know others within that person's circles and the linkages go on and on. Yet (Davis, 2007:147) explores the snowballing technique as a data gathering method in which the researcher first identifies one or two people who fit the criteria of the targeted group of interviewees. When the interviews are finished, the researcher asks interviewees if they can suggest other suitable informants who may meet the researcher's requirements. The technique made the researcher's task of identifying informants much easier. The snowballing method was used in the study to easily identify the most appropriate informants. For example, after interviewing chiefs and headmen, they in turn, referred the researcher to other relevant informants who included farmers, traditional healers and herbalists, traditional midwives, just to mention those among others.

4.10.2 Interview Guide

An interview guide is a set of open-ended questions, which are sometimes accompanied by probing in order to guide or structure the discussion to be a semi-structured interview (Bryman, 2004:524). In this study, the researcher used semi-structured interviews to gather in-depth information on the nature of indigenous practices in Gutu district. Interviews also assisted in establishing how indigenous knowledge is shared, transferred and preserved in order to benefit agriculture and the conservation of the environment. With structured-interviews, the interviewer was flexible in terms of the order in which topics are considered, usually this is meant to let the interviewee develop ideas and speak more widely on issues raised by the researcher (Descombe, 1998: 113). The answers are open-ended, and there is more emphasis on the interviewee elaborating on points of interest. The use of interviews is usually determined by two factors, either to get more superficial information from a large number of people or collecting more detailed information from a smaller number of people (Denscombe, 1998: 112).

In this study, the intention was to collect as much information as is possible from purposively selected respondents from Gutu residents.

The researcher's first port of call was the chiefs and headmen's court and the reason was that they are the community leaders, so by first interviewing them, it opened access to the rest of the community members under their jurisdictions. The interviewing process involved the researcher posing open-ended questions contained in the interview guide and recording everything verbatim using a voice recorder (see Appendix 2). Where necessary, the researcher probed and asked some follow-up questions, either for clarity or for further details. Since the interviews were a face-to-face interaction, it allowed

the researcher to get as much information as he wanted on the study. As an example, below is an extract from one of the interviews:

Interviewer: In your own understanding, what constitute indigenous knowledge?

Interviewee: When we talk of indigenous knowledge, it concerns the kind of life that was followed way back by our elders, and the practices have been passed down to the next generations. This applies to issues to do with the farming activities, uses of the environment and how people interacted in communities and with their surroundings.

Interviewer: Indigenous knowledge practices have been seriously compromised today, in your view what are the causes?

Interviewee: The reasons why indigenous traditional practices have changed is because people are turning to western ways of living, be it the food they eat, their values, beliefs and customs have been westernized, and this has transformed communal practices in

many negative ways, such as failure to follow set rules and laws set by chiefs in communities, and also acts of disobedience by children among many other ill practices.

Interviewer: In your view, how can the younger generations gain from the indigenous knowledge of yester year?

Interviewee: The younger generations should take time to listen to the teachings of the elders and stop despising them as they do today, these are the people who have seen it all and can provide useful advice based on their life experiences.

The interviews targeted individuals who were purposively selected for interviews from across Gutu district. Through the interviews, individuals shared their insights into what they believed to constitute indigenous knowledge, its usefulness in communities, how the knowledge is shared, transferred and how it can be preserved and protected from complete loss. The interviewees comprised of different categories of members of the society, and this had an advantage of having diverse views and opinions on issues discussed, and that helped in corroborating on some issues or having different opinions all together. Either way, it helped with in-depth information on the subject under discussion. The researcher also asked further probing questions where he thought answers were incomplete and the interviewee provided with more details and clarity from the interviewees. According to Barbie, (2011:277), probing is a technique employed in interviews so as to solicit for more complete answers to a question. Since the interviews were recorded verbatim, they produced some 1265 pages of raw data for analysis.

The interview process was characterized by a series of problems. For example, with chiefs and headmen, there were a set of procedural requirements, for example the payment of a token amount of money in order to be granted permission to interview the chief (*Mari yedare ralshe*). Additionally, the chiefs required core members of their team to be present as they granted the interview. This resulted in rescheduling some of the scheduled interviews in order to allow the chief to inform relevant members to be present. On another instance, the researcher made two unsuccessful attempts to meet the chief, and then later, information came out that the chief had passed on.

It is part of the traditional practice not to quickly reveal information when the chief is sick or even when he dies. Many of the targeted interviewees had to make contingent adjustments to their busy schedules as they would be going about different activities at homesteads or in the community. As such, it took the researcher more time, waiting for an opportunity to interview them. In other instances, interview sessions were interrupted when visitors arrived at home and these had to be welcomed and entertained for a while before the interviews resumed. At times interview sessions were hurriedly conducted, like in the case with two Agriculture and extension officers and one Veterinary assistant officer who had to attend to some emergence meetings. Instead of the interviews lasting between 45 minutes to 1 hour associated with discussion interviews, these were below 20 minutes per interview. The limited time did not affect the information since the informants focused on key issues which were useful to the study.

4.10.3 Focus Group discussions

Bryman, (2004) explains a focus group as a form of group interview in which there are several participants, with the addition of a facilitator. The numbers involved usually varies, Denscombe, (1998:114) says they range from four to six people. Remler & Van Ryzin, (2011:523) explain that a focus group is a qualitative group with interviewing procedures and it involves 6 to 12 participants. The participants may be seated around a table, with a moderator who asks questions and guides the discussion. A focus group can also be regarded as a type of unstructured interview in which a number of people are interviewed at the same time, sharing ideas with the interviewer and with each other (Stangor, 2011: 421). In this study, the researcher conducted 8 focus group discussions out of the planned 12. The groups formed were constituted of 6 participants per each

group, thus comprising a total of 48 participants for the 8 focus groups conducted. The participants were derived from the communities dotted throughout the district. In some instances, the focus groups comprised of participants from adjacent chiefdoms since they share a lot in common and the interactions tended to overspill from one area to the other, hence sharing common experiences. The aspect of common knowledge of the area participants live in was exhibited by participants on what happens in their surroundings and even in distant chiefdoms. This was mainly due to the fact that rural people fulfill their errands on foot, walking long distances which cut across other communities. This usually happens when people move around in search for the traditional brewed *doro* (beer), or when going out hunting and when visiting relatives in neighbouring areas or for some political or church gatherings.

The researcher, as the facilitator, took cognizance of the term 'group' considering that it entails those present during the interviews were supposed to interact with one another at group level. Group interviews have several advantages over individual interviews. In particular, they help to reveal consensus views, and may generate richer responses by allowing participants to challenge one another's views or verify research ideas gathered through other methods and can also enhance the reliability of responses (Lewis, 1992:413), as cited by Denscombe, (1998).

However, there are weaknesses which can be realized from focus group discussions. They hold the prospect of drowning out certain views, especially those of 'quieter' members (those who do not talk much but are knowledgeable and only express their views when engaged). Certain members of the group can be dominating such that it is

only themselves who are heard. There are other instances where the gender issue can be considered. For example men tend to hog the centre stage in group discussions, and women's views may be surpassed. Another potential disadvantage of group interviews is that the opinions which are expressed are the ones that are perceived to be 'acceptable' within the group. Where group members regard their opinions as contrary to the prevailing opinion within the group, they might be inclined to keep quiet or moderate the views (Denscombe, 1998).

In order to fully utilize the benefits of focus group interviews and at the same time minimizing weaknesses likely to be caused by the disadvantages of the data gathering method, the researcher took a number of measures as precautions. The 'quieter' members of the groups were catered for through probing for their opinions or to share their views on what others would have contributed. What the researcher emphasized on was to ensure that value is placed on interaction within the group to elicit for information, rather than collecting each individual's point of view. Denscombe, (1998:115) states thus, "there is a special value placed on the collective view, rather than the aggregate view". What this means is that through some informal interchanges, focus groups can lead to insights that may not have come to light through the one-on-one conventional interview. Another measure adopted in order to do away with individuals who dominate the discussions or the problem of overshadowing women's contributions, was to clarify the terms of reference from the beginning of the discussions. All members were encouraged to freely participate and where conflict of interest arose, couples were not put in the same groups. The researcher tried to ensure that groups comprised of members who were more or less at par in terms of status or background. For example, in constituting focus

groups, traditional healers and herbalists formed a discussion group, while farmers and agricultural extension officers were combined, traditional midwives, mainly formed a group dominated by female participants because the work is mainly a female domain.

4.10.4 Observation

The study partly gathered data through the observation research method. According to the Oxford Advanced Learner's Dictionary (2010), the term observation refers to the act of watching something carefully for a period of time with the intention to learn something. The observation process requires that the researcher be able to draw from direct evidence of witnessing events first hand (Denscombe, 1998). In a way, observational research, as applied to this study, entails a process of closely watching, taking note through recording of the activities which community members are involved in, especially people's daily routines and the process should be done over a long period of time, which may take several years. Stangor, (2011) explains that observations should be done in an objective manner. This may mean to say that the researcher has to be open-minded when observing how people do things in the communities and be able to derive some meaning with an open mind which is not subjective, least it portrays bias.

The area under study happens to be the district where the researcher comes from. This presented a number of advantages such as familiarity with some of the areas under study, past experiences, and these were considered observations over the years of staying in Gutu district, spanning over four decades. Nevertheless, the researcher

conducted observations for four months, specifically for this study. The observations were aimed at understanding the current state, which is how the situation stands today, in contrast with the past. In order to overcome the weaknesses of familiarity, past experiences and the current state, the researcher employed a systematic observation guided by an observation schedule. The schedule helped to minimize and eliminate the variations that arise from data which is based on individual perceptions of events and situations (Denscombe, 1998). The major advantage of an observation schedule is that the observations take place within a given framework to ensure consistence with what can be regarded as a checklist of things to be observed.

During the four months of data gathering in Gutu district, the researcher made observations for a period of four continuous months, from mid-April to mid-August. During the period, the researcher observed a number of communal activities. The observations included activities carried out by people at their homesteads and in the communities at large. The observations were focusing on seasonal tasks such as the harvesting and storage of crops (end of April to early June); preservation of thrashed grain seed (mid- July to mid- August) and preparation of fields for the next farming season (mid-August onwards). The process of land preparations witnessed residents who were involved in the digging of some basins-like holes for conservation farming. Yet other people were busy digging out manure from livestock kraals in order to use it in replenishing soil fertility in the fields.

The researcher also observed that rotational farming which is aimed at replenishing soil fertility and the vegetation was no longer practiced by Gutu communities. This is due to

over-population which has drastically reduced land to be left idle. The other observations took note of people who were digging anthill soil in order to spread it to weak soils so as to improve soil fertility. During the same period, the researcher observed how residents interacted with the environment. It was noticed that residents collected firewood from the environment, and the process involves the cutting down of live trees and bushes and dry them for firewood. In terms of livestock management, animal movements were restricted through herding until the early month of June, only to be let free after people had finished harvesting. The researcher further observed that animals were affected by limited grazing areas and that the pastures were poor due to limited land. The observations covered wide areas as the researcher drove around the district visiting selected informants. In fact the activities observed generally depicted what Gutu residents go through in their communities at different times of the year.

4.10.5 Transect Walks

A transect walk is a systematic walk along a defined path (transect) across the community or project area together with the local people in order to explore conditions of the area by observing, asking, listening, looking and producing a transect diagram (World Bank n.d). The use of transect walks was adopted as a participatory method in which the researcher benefitted from practical involvement with what goes on in the communities. Through the transect walks, the researcher asked participants in the study to take him/her on a walk through the community or organization (Rule & John, 2011: 69). When conducting the walks, participants pointed out at various things which they consider to be significant in the environments. In this study, the researcher carried out the walks in areas where he was visiting the informants for interviews.

Transect walks have a number of strengths such as witnessing practical activities on the ground. Transect walks also afforded the researcher time for listening and asking questions to people in order for them to clarify issues on different activities in the communities such as crop harvesting, processing and storage procedures. The walks also helped in making comparisons of activities in different areas of the district so as to be able to draw conclusions on IK practices. The weaknesses associated with transect walks are that the community members who take the researcher around, may decide to direct him/her to places where they only want the researcher to see.

Yet another weakness is that the walks may not be able to cover greater distances since they are just too brief and only scan a smaller area under study. However, in this study, transect walks helped the researcher to verify on activities raised about community practices as narrated by the informants during interviews.

In some of the walks undertaken, the researcher went through areas with tree plantations, irrigation schemes, conservation farming preparations, paddocking systems for cattle and the protection of vegetation, among many other activities seen in the district. The different projects just mentioned are part of the local-level communal undertakings. They are regarded as important, and a sources of pride for the communities. At the same time, the local development projects are explained as part of a proud history with significant landmarks in people's lives (Rule & John, 2011: 69). In this study, the transect walks were intended to verify on the ground whether

communities were still adhering to indigenous knowledge practices in farming and the conserving of the environment, and if there were changes, what kind of changes can be talked about in the communities.

For the researcher to benefit from transect walks, the leading participants were carefully chosen, taking into consideration issues like age, gender and knowledge status and position in society. The elderly participants were useful in providing the historical narratives on issues which dates years back, while either men or women were required to explain issues peculiar to their gender, say traditional midwives highlighting issues relating to the use of herbs in assisting expecting mothers during child deliveries. As for the issue of status, this depended on the position of the individual in society, for example, chiefs and headmen, played the role of being custodians of traditional customs, values and beliefs in areas under their jurisdiction. Chiefs and headmen encouraged their communities to observe indigenous and traditional practices of maintaining the environment through avoiding the cutting down of big trees, burning of grass and cultivation near river banks. As a way of promoting sustainable agriculture, chiefs encouraged the growing of small grain crops since these ensured reliable harvests even when the rains are erratic.

4.11 Data Collection Techniques

The researcher utilized the existing Local Government structures in Gutu district to secure the necessary clearances in order to conduct interviews. But prior to securing of

permission, the researcher did his preliminary homework of identifying potential interviewees. This was done through making some courteous calls on potential respondents. The decision to make visits on targeted informants helped in the establishment of familiarity and trust since familiarity helped in preparing interviewees to be comfortable and ready for the interviews. As if to support the approach, Leedy & Ormrod, (2010: 145), explain that the potential sources of data are limited only by the researcher's lack of open-mindedness and creativity. In this study, the undertaking of preliminary steps to identify potential respondents, helped in snowballing, when respondents directed the researcher to other informants, typical of the snowballing approach. Before conducting the interviews, the respondents were fully appraised about the purpose of the study, and were also assured of the confidentiality and anonymity of their identities (Wisker, 2008).

The study used the triangulation approach, whereby multiple data gathering methods were used such as face-to-face interviews, focus group discussions, and observations as well as transect walks. In order to ensure that the study was above board, the researcher presented some clearance letters, first was the clearance certificate from the University of Fort Hare and another one from the supervisor. These were presented to the District Administrator's office. The District Administrator then wrote a letter of notification to the chiefs and headmen so that they could receive and grant me permission to conduct the study in areas under their jurisdiction. Thereafter, the interviews went on unhindered when selecting informants who included chiefs and headmen, traditional healers and herbalists, midwives, leaders of resettlement areas, agricultural and veterinary assistant officers as well several other community members with knowledge on different indigenous

practices in Gutu district. In order to make the huge tasks manageable, the researcher engaged two research assistants whose responsibilities were to jot down notes on observations done. They were also expected to record the likely meanings/interpretations derived from the data collected from interviewees. The researcher explained and clarified a number of procedures such as the upholding of ethical considerations during the interviewing process. The process of going around the communities was made easy by the fact that one of the research assistant had a lot of knowledge about the communities we went through. The advantage of familiarity helped in that we were warmly received and assisted by the respondents we visited.

The interviews which were carried out gathered people's views on the role played by indigenous knowledge in farming activities and the management of the environment. The information gathered was premised on answering the research questions posed in (table 4.3). Interviewees were taken through memory lane, with the first question asking the participants to explain what they understood by the term indigenous knowledge. As they responded to the question, they were also asked to cite examples of some of the indigenous practices which are practiced in agriculture and the conservation of the environment. The posed questions assisted in that participants were able to explain that indigenous practices in agriculture were going down. For example, the practice of rotational farming which used to be practiced in Gutu district in the 1920s was no longer followed due to restricted land available in communities (Muchineripi, 2008: 8). The

practice has stopped due to the increase in population which has consumed all the land reserves which existed in the early 1920s. Even the environment has been affected, whereby residents who used to conserve big trees by using dry tree branches for fire wood, are now cutting down the trees and drying them for firewood. This is due to the fact that the number of people living in Gutu has increased and thus it strains the resources. For further details on the interview questions, see (appendix 3).

Below is a summary table of the objectives, research questions, research methods, data sources and instruments used in conducting the study in Gutu district.

Table 4-3: Objectives, research questions and possible sources of data

Objective	Research question	Research method(s)	Data source	Research instrument
To identify the different types of indigenous knowledge peculiar to agriculture and in conserving the environment	Which types of indigenous knowledge are used in agricultural practices and the conservation of the environment?	Survey Interviews Focus groups	Primary and secondary sources	Interviews Focus groups Observation
To establish the challenges encountered by Gutu communities in utilizing indigenous knowledge in agriculture and the conservation of the environment	What are the challenges faced by Gutu communities in utilizing indigenous knowledge in agricultural practices and environmental conservation?	Survey Interviews Focus group	Primary and secondary sources	Focus group Interviews Observation
To identify constraints associated with the acquisition of indigenous knowledge, its sharing, transfer and preservation in Gutu communities	What constraints are encountered in the acquisition, sharing, transfer and retention of indigenous knowledge by Gutu communities?	Evaluation Interviews Focus group	Primary and secondary sources	Interviews Focus group Observation
To propose measures that may be adopted in order to make indigenous knowledge appreciated for use in agricultural practices and the conservation of the environment	What measures can be adopted to make indigenous knowledge appreciated and valued in Gutu district?	Focus group Document analysis Interviews	Primary and secondary sources	Interviews Focus groups Observation

4.12 Pilot study and Instrument Validation

The researcher carried out a pre-test of the data gathering instruments in order to ensure valid and reliable results. The pilot study of the two interview guides, (face-to-

face interviews and focus group discussions) were done in two adjacent chiefdoms under Chimombe and Mazuru. Twenty interviews were conducted within the two chiefdoms, ten in each and the outcomes were used to refine the structured and semi-structured interview questions. The respondents who were selected helped in improving the wording of questions as well as restructuring the order for a smooth flow of responses (Hermanns, 1995: 182). Pilot testing, as put across by Stangor, (2011: 100), involves the trying out of a questionnaire or other research on a small group of individuals to get an idea of how they react to it before the final version of the project is created. Sharing similar sentiments on the importance of pilot testing is Neuman, (2006) contends that a pilot study help in refining the questionnaire and the interview process. In essence, by piloting the research instruments, the intention was to minimize ambiguity in questions as well as to remove some glaring errors so that they are appropriate to gather the data they are supposed to get from the respondents. The researcher also enjoyed the opportunity of familiarizing himself with the data gathering equipment, the voice recorder's several functions of pausing, stopping, erasing, opening of folders and the subdivision of the folders as one stores data. More so, the pilot study afforded the researcher's assistants the opportunity to experience first hand procedures of conducting the interviews.

The researcher further perfected the data gathering tools by seeking the views of fellow students and other seasoned researchers. Considering that the researcher employed triangulation, the approach assisted in augmenting the collection of data through a process which ensured the validity and reliability of the study findings.

4.13 Reliability and Validity in Research

The term reliability in research is the degree to which a measure of a concept is stable (Bryman, 1998: 543). Reliability is also about dependability and consistency (Neuman, 2006: 188). On the other hand, Leedy & Ormrod, (2010: 93) explain reliability as the extent to which a measurement instrument yields consistent results when the characteristic being measured has not changed. Put in simpler terms, Remler & Van Ryzin, (2011) view reliability as the consistency of a measure. Therefore, consistency is basically the central concept in the measurement of different variables that the researcher plans to combine into the same measure of a single conceptual variable (Stangor, 2011: 101-102). Thus, reliability is the extent to which a measured variable is free from random error (Stangor, 2011: 91). It is important to note that reliability comes before validity because reliability is concerned with creating a measure that is tested in relationship to other measures.

Validity is concerned with the integrity of the conclusions that are generated from a piece of research (Bryman, 1998: 545). Validity as defined by Remler & Van Ryzin, (2011: 536) should be looked at in terms of measurement, that is how well a measure represents the construct of interest. Leedy & Ormrod, (2010: 92), explain the validity of research instrument as the extent to which the instrument measures what the instruments are intended to measure. As if to corroborate the view, Van der Riet & Durrheim, (2006) state that validity is the degree to which the research conclusions are sound. In this study, the researcher recorded verbatim the views of the interviewees using a voice recorder and later transcribing the recordings. The responses given by

interviewees on similar questions asked to all respondents were subject to reliability and validity testing. The same was done with contributions from focus group discussions, these had to be verified for their reliability and validity since views came from different respondents.

4.14 Response Rate

The percentages of people who respond to a survey or other data collection effort constitute what is called the response rate (Remler & Van Ryzin, 2011: 148-149). The researcher enjoyed good response rate due to the fact that he moved extensively in the communities interviewing individuals and conducting focus group discussions. The researcher followed laid down procedures in terms of getting audience with the chiefs and headmen, through the procedural payment of *mari yedare ralshe* (token fee for the chief's court). As for individual interviewees to participate, the researcher explained and promised that the findings of the study were going to benefit the communities which were studied.

4.15 Challenges in the field

The process of data collection had a number of challenges which the researcher had to grapple with. The major challenge was the size of the district, measuring 213 263 hectares (Agriculture, Technical and Extension Services department, Gutu, 2011). Although the researcher surveyed for the interviewees and focus group participants, there were costs involved as the researcher his assistants drove to far and wider areas of the district.

There were instances when interviews were postponed as the chiefs needed to have their trusted assistants present as they participate in the interviews. This had cost implications to the researcher who had to drive back in order to fulfill the tasks. At times, the researcher failed to locate potential respondents just because they had travelled to other areas outside the district, with others having visited their children and relatives in urban areas. Where alternative respondents were available, these were interviewed. However, there were instances where they could not be located. More so, it was also a drawback that some of the potential informants were not feeling well, so the interviews were either postponed or completely cancelled. As for the focus groups, there were instances when it was difficult to coordinate the participants to form groups. However, the problem was not a big one hence there was 75% and 67% responsive rates for individual interviews and focus groups respectively.

4.16 Data processing

The process of data gathering began in mid-April and ended around mid-August of 2011. The period from September to December 2011 was devoted to the transcription of the interviews. The Oxford Advanced Learner's Dictionary (2010) explain the term transcribe as the recording of thoughts, speech or data in a written form or in a different form from the original. Transcription of tapes as defined by Denscombe (1998: 128) is generally far more time-consuming than the actual collection of the data. This explains why it took the researcher another four months to transcribe the collected interviews. The written transcripts formed the various themes under which the data was analyzed, and the same applies to the information recorded from focus groups. The

data analysis from focus group discussions was fused with what came out of content analysis, transect walks and observations.

4.17 Ethical Considerations

The researcher made sure from the beginning that ethical considerations were fully embraced as people were the key participants in the study. Ethical procedures were also applied in data analysis and report writing. The issue of ethical consideration is a legal requirement both in South Africa and Zimbabwe hence the researcher adhered to procedures. The researcher secured an ethical clearance certificate from the UFH ethics clearance committee. In Zimbabwe, the researcher was cleared by the District Administrator of Gutu district as well as the local leadership.

By embracing ethical guidelines, the researcher ensured that the participants gave their fully informed consent before taking part in the study. As individuals were interviewed, the researcher factored in the aspect of respecting the privacy of the interviewees.

Stangor, (2011: 51-52) explains that since studies which involve human beings end up with the researcher having to use data from the different participants, the researcher should ensure that there is no violation of the confidentiality of the data that they contribute. When data from participants are used, their identity should always remain anonymous. This kind of approach is what Barbie, (2010) views as bordering on morality, the right and wrong when human beings are the research participants. It is the right of the respondents to ensure the privacy of their identity since it would be wrong to reveal the identity of participants in some instances in which information should always be confidential. In this study, the data collected, although used in the answering of research questions, the identities of participants were kept anonymous throughout the

study. In order to ensure that no harm, victimization or any kind of scrutiny would be raised against the participants, clearance letters were produced. The letters came from influential and trusted offices such as the District Administrator's office, chiefs, headmen and kraal heads. With such kind of assurances, the participants opened up and freely participated in the interviews and focus group discussions.

Wisker, (2008) hints on the importance of giving guaranteed assurance to study participants. In this study, assurances were done when the researcher clarified the reasons for the intended study, including the presentation of a clearance letter and a certificate of clearance from the Supervisor and the University of Fort Hare respectively (see appendix 5). The process of assuring privacy and confidentiality to participants was done in two ways. First, this was done as part of the preliminary visits to intended participants in the district. The researcher also reiterated the assurance just before the conducting of the interviews. The initial phase of assurance was meant to give participants enough time to consider their participation in the study (Leedy & Ormrod, 2010: 101-102).

This is what is regarded as informed consent, whereby any participation in a study should be strictly voluntary (Neuman, 2006: 135). In this study, participants did not sign any consent documents as done with other studies, for those who agreed to be interviewed, it was considered as some form of consent and those who were elusive, giving excuses, it was also considered as refusing to consent.

Any research study involving human beings should respect participants' right to privacy. Under no circumstances should a researcher report, either oral or written, be present in

such a way that others become aware of how a participant responded or behaved, unless the participant has specifically granted permission, in writing, for this to happen (Leedy & Ormrod, 2010: 102). On the other hand, Barbie, (2010: 136) discusses the importance of confidentiality, of which participants' identity and responses should not be revealed to other parties. Even when the data are being analyzed, there should not be specific links to individuals. Instead, participants can be given unique, arbitrary code numbers and then label any written documents with the numbers rather than with people's names (Leedy & Ormrod, 2010: 102). Confidentiality of individual participants should also be enhanced through use of percentages to represent the responses (Neuman, 2006).

Focus group discussions were used to collect data from participants selected from various parts of the district. Since participants aired their views in a group environment, appropriate ethical considerations observed. The researcher had to explain the purpose of the focus group discussions but without influencing what participants would say in the discussions. On the issue of confidentiality, participants were assigned pseudonyms or numbers which identified each participant. It was also important to emphasize both at the beginning and the end of each focus group session that participants should respect each other's privacy and anonymity. Once outside the focus group setting, they were not supposed to reveal the identities of other participants or indicate who made specific comments during the discussions. In this study, the researcher was the moderator, posing all questions specified in the focus group question guide, keeping the discussion on track, and encouraging all participants to contribute. The responses were recorded

using a voice recorder. However, the research assistants played the role of the note-takers and this provided the necessary back up for any malfunctions of the voice recorder. The researcher also fulfilled the other ethical expectation of reporting the findings in a complete and honest manner, without any misrepresentations about the nature of the findings (Leedy & Ormrod, 2010: 103-104).

Moreover, the researcher made it a point that there were no data fabricated to support a particular conclusion, no matter how “noble” the conclusion seemed to be. Equally important was the issue of giving due acknowledgement to other people’s ideas so as to guard against plagiarism and document theft. This was necessary even where one paraphrased the ideas into one’s own language, acknowledgement remains mandatory (Leedy & Ormrod, 2010: 104). As for the findings, the researcher fulfilled the participants’ rights to be furnished with the study outcomes, since they were involved as participants. Where community leaders were supposed to be the key players in implementing the findings of the study, audience was once again sought with them and discussed professionally. In order to contribute to the existing knowledge body, the researcher put in place work plan for journal articles publication of the findings in some peer-reviewed Journals.

Over and above all, the researcher verified and ensured that the necessary ethical principles were met. These are summed up to include protection against harm to the participants, ensuring that participants took part in the research with informed consent, promote the privacy of individual participants and also avoiding deception or misrepresentation of the research and its findings (Bryman, 2004: 509-514).

4.18 Chapter Summary

The chapter described the research methodology employed in the study. The research utilized the mixed-methods approach which is also referred to as triangulation. The triangulated data collection methods include face-to-face interviews, focus group discussions, content analysis, and observations as well as transect walks. The idea of combining different data gathering tools was suitable for the study, considering that the respondents were surveyed through purposely sampling from the whole of Gutu district. Individual interviews and focus group discussions were utilized for in-depth individual views and varied or corroborated responses were gathered from group participants respectively. The analysis of documents mainly looked at contents of pamphlets reporting mainly on conservation farming activities in different areas of the district. The information from documents was combined with views from interviews and discussions in order to assess similarities or differences with the other methods. Observations and transect walks were done as a way of verifying information from interviews. The chapter also included data analysis and ethical principles. The next chapter focuses on data presentation, analysis and interpretation.

CHAPTER FIVE

5 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

5.1 Introduction

The researcher focuses on the presentation, analysis and interpretation of data that were gathered using various methods. The presentation is mainly going to be qualitative though is fused with limited quantitative analysis. The qualitative approach is premised on themes which are aimed at bringing out the role played by indigenous knowledge in the areas of agriculture and environmental conservation in Gutu district. Qualitative data analysis is usually based on an interpretative philosophy that is aimed at examining meaningful and symbolic content of qualitative data (Maree, 2007: 99). Since data was gathered through the triangulation approach, by employing the qualitative data analysis procedure, the researcher intends to establish how participants made meaning of a specific phenomenon through an analysis of the participants' perceptions, attitudes, understanding, knowledge, values, feelings and experiences in an attempt to approximate their construction of the phenomenon (Maree, 2007: 99). The research findings would emerge from the frequent, dominant or significant themes inherent in the raw data. The data gathered from interviews, focus groups, observations and transect walks were presented according to the study objectives.

The qualitative data gathered through face-to-face interviews and focus group discussions were put into themes and then analyzed for the findings. Observations and transect walks were also analyzed and corroborated with other data in order to make some inferred deductions. Some tables, graphs and charts were drawn in order to

present issues which involved figures.

In presenting the research findings, the researcher upheld ethical standards by ensuring that the identities of participants were confidentially kept where necessary. In some instances where information was cited verbatim participants identity at times came open. This applied to interviews with chiefs and headmen, their identity at times could not be hidden. Since Gutu district is far and wide in terms of coverage, the researcher could not locate all the targeted informants and this explains the 75 out of 100 (75%) and 8 out of 12 (67%) response rate for individual interviews and focus group discussions respectively. Nevertheless, the fact that triangulation methods were used to gather data, helped in improving the reliability of the findings, especially where same results were obtained repeatedly on the same sample. As for the validity of the findings, these were mainly determined by the manner in which the interview guides were written, and also what was being observed and analyzed from documents. The instruments were expected to measure that which they were supposed to measure so that results could be determined as valid.

5.2 Participants' profile

The interview schedules comprised of an important section of preliminary information. The initial questions were basically focusing on biographical information, which are the interviewees' profiles. The study of indigenous knowledge can be influenced by factors such as the age of the participant as well as the duration of stay in a given geographical area. The information is useful in that as is the case with the griots (elders) of West Africa, the elderly members of the community in Zimbabwe are regarded as repositories

of indigenous knowledge in the communities they live. This is based on what I think is true that the longer a person lives in an area up to an old age, he/she is likely to become wiser and more knowledgeable of the surroundings.

The assertion turned out to be true when the elderly members could vividly explain the changes which have taken place in the farming methods used in the communities and the deterioration of the environment over the years. Elderly people in the community are the knowledge fountains of the society, mainly because of their years of experience acquired through interaction and observation of events in their surroundings. Information from the elderly members formed the basis of the data analyzed. The information collected from the elderly members was useful in understanding activities in agriculture and the environment. Some of the elderly members happened to be in positions of authority such as chiefs, headmen or village heads. The information was useful in the sense that since chiefs, headmen and village heads are the custodians of community laws; they were able to explain the reasons behind a number of changes in the communities they live in today.

5.2.1 Gender and Age

Gutu district comprises of male and female residents of all age groups, hence there was no discrimination in terms of gender and age, although there were noticeable traits in terms of gender and age. The interviewees' ages ranged between 30-96 years and they were people who grew up in the communities they were born. While the 30 year age group appears to be too young to comprehend indigenous knowledge practices, what

the interviewer considered was the duration of continuous stay in their given areas. The longer a person stays in a given geographical area, the better that individual gets acquainted with the happenings of the area. As such, a 30 year old with continuous years of staying in a given area was more knowledgeable than a 60 year old with a few years in an area. The other phenomenon is that there were fewer female participants, 21 out of 75 (28%) as opposed to 54 out of 75 (72%) males. This was influenced by the nature of Gutu communities that men are heads in their homesteads and therefore, they assume the dominant roles in most responsibilities. For example, when visitors arrive home, it is the men's responsibility to establish the nature of their visit so that they can be attended to accordingly. However, it is important to point out that, despite the gender imbalance, there were significant contributions from the women interviewed as they shared information on agriculture and the management of the environment. See (table 5.1) for details on the next page:

Table 5-1: Interviewees' Profiles

Interviewees	Number of interviewees	Gender numbers		Percentage of interviewees %	
		Male	Female	Male	Female
Chiefs/headmen	12/75	12	0	16%	0%
Elderly members (Over 80 years)	10/75	7	3	9%	4%
Leaders of resettlement areas	5/75	5	0	7%	0%
Prominent farmers	12/75	10	2	13%	3%
Traditional healers/herbalists	6/75	5	1	7%	1%
Midwives	4/75	0	4	0%	5%
Agricultural Extension Officers	5/75	4	1	5%	1%
Veterinary Officers	4/75	2	2	3%	3%
Other community members	17/75	9	8	12%	11%
Totals	75	54	21	72	28

5.2.2 Participants' duration of stay in their areas

Familiarization with indigenous knowledge practices can be depended on the duration an individual has stayed in a given geographical area. From the sampled participants, for example, the chiefs and headmen category, they indicated that they had lived in their current areas since birth; the same applies with some elderly members in the

communities, prominent farmers, midwives, traditional healers and herbalists. However, it was different in the case of those in resettlement areas, the duration of stay ranged from 15 to 25 years since they were resettled in the areas from elsewhere in the 1980s. The Agricultural Extension Officers and the Veterinary Officers had the shortest durations of stay in the areas where they operated, with 4 of the Officers just being 2 years in the area since they were deployed to the area as employees. However, the situation was different for the head of the Agricultural Extension Officers. He was born in Gutu district, besides the fifteen years he had served in the same position. It was an advantage to the Officer, in that he combined knowledge of the area where he was born as well as the professional knowledge in order to be able to fuse between indigenous knowledge and the current scientific knowledge used in agriculture. The number of participants, who indicated that they have been staying in the areas they currently reside in, stood at 88%. The knowledge they shared was useful on the basis that it was mainly based on years of experiencing the surrounding areas.

5.2.3 Social status of participants

The participants were drawn from a cross section of the society, comprising of the traditional community leaders, chiefs, headmen and village heads. Also included were leaders of resettlement areas, elderly members of the society, and various other practitioners such as farmers, traditional healers and herbalists, midwives and Agricultural and Veterinary Officers. From the face-to-face interviews and the focus group discussions conducted, there were trends picked up by the researcher in terms of

participants' responses. Interviews involving chiefs and headmen had immense benefits since they revealed a lot of knowledge on issues relating to indigenous knowledge. The traditional leaders narrated indigenous knowledge concerned with the knowledge acquisition, use, sharing, and its transfer and retention for posterity. The knowledge shared by chiefs and headmen on indigenous practices was very useful since such leadership positions are bestowed on individuals who are supposed to be the custodians of traditional values, customs and beliefs in any given society. Equally useful indigenous knowledge was acquired from the elderly members of the community, and this was due to the long duration of stay in their communities. The experiences they acquired over the years were the basis of their wide range of knowledge. However, there were incidences where by some of the elderly members showed mental lapses and could not clearly recall events which happened a long time ago. These were left out and focus was directed on individuals whose memory was still vivid on the indigenous practices of their area.

Other useful contributions on IK came from prosperous members of the community such as farmers. The farmers exhibited knowledge in terms of crop cultivation, planting time, cultivation methods, harvesting and storage. As for traditional healers and herbalists, they shared knowledge about the environment, where they get the herbs and the challenges they are facing due to the destruction of the environment. Midwives also shared their experiences in utilizing herbs from the environment to assist women in preparation for child birth. As for Agricultural and Veterinary Officers, these are professionals whose focus is mainly on the conventional and modern methods of crop cultivation and animal rearing respectively. In spite of possessing modern knowledge,

the Officers showed an appreciation of the indigenous practices in agriculture (Conservation farming) and animal health (use of herbs) to treat animal wounds, just to mention those few.

5.2.4 Participants' levels of education

The interviewees were a mixed group of people, whose levels of education fell within the literacy (61 out of 75 interviewees) and illiteracy (14 out of 75 interviewees), representing 81% and 19% respectively, (see table 5.3 ahead). Interviewees who are literate and having lived in an area for a long period of time exhibited an advantage of being able to articulate issues on Indigenous Knowledge since they documented some of the practices which they could easily refer to. As for the illiterate elderly interviewees, some of them were showing signs of forgetting things. This was due to old age which results in memory lapses. For details on the role played by education in imparting indigenous knowledge to those who intended to acquire it, see the graph below:

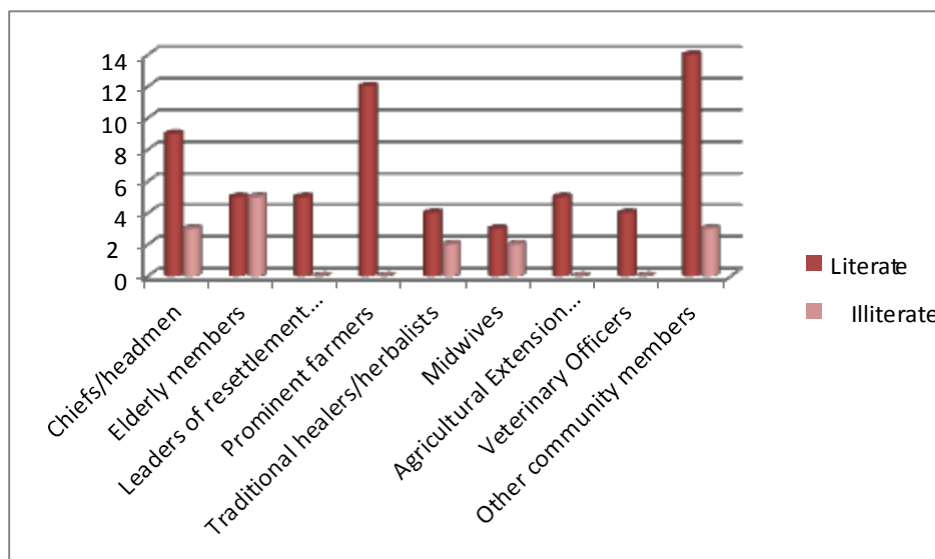


Figure 5-1: Interviewees' Levels of education

5.3 Indigenous Knowledge for agriculture and environmental conservation

Indigenous Knowledge is knowledge acquired through years of experience by people who have continuously lived in an area whose environments they gradually understand over a long period of time. The definition links with this study in that the study sought to establish the role of IK in Gutu communities and has become part of their life. By identifying Indigenous Knowledge which is peculiar to agriculture and the conservation of the environment, the intention was to establish whether IK still has a role to play in agriculture and the conservation of the environment in Gutu district. In trying to establish the manner in which IK was of use to communities, focus was directed on the types of crops grown by the communities in Gutu district.

Further analysis goes on to explore the reasons for choosing either maize or the small grain crops for cultivation, methods used for cultivating the crops, weeding procedures and the harvesting and storage of the crops. The same indigenous knowledge is assessed for its role in environmental conservation. When addressing environmental conservation issues, focus was mainly on measures that could be adopted in order to safeguard the natural resources (the flora and fauna) from total destruction. The study thus looked at the nature and state of vegetation prevalent in different parts of Gutu district to present day. The studies further looked at the current state of the flora and fauna, contrasting with the previous years, and then try to establish the reasons for the disparities. From the interviews conducted, participants overwhelmingly agreed that there were significant down trends in both agriculture production and environmental conservation because of a disregard of indigenous knowledge in the communities.

The responses from 68 (91%) of the 75 participants, agreed that changes in IK management had affected agriculture productivity and the destruction of the vegetation. The other 7 interviewees, constituting (9%) comprised of resettled farmers in areas in the productive areas in Gutu were of the view that things were still good for them. The resettled farmers enjoy the advantage of normal rainfall and good fertile soils which are the reason for their good crop harvests compared to their counter parts in rural communities. Communal areas are faced with problems such as overpopulation, poor soils and erratic rainfall. The resettled farmers other than having less population compared to the rural communities, the leadership indicated that their areas still enjoy fairly good vegetation sufficient to meet people's domestic needs, unlike in rural areas where vegetation has been extensively destroyed due to overpopulation.

5.3.1 Indigenous practices in Gutu Communities

Out of the targeted 100 interviewees, 75 participants were successfully interviewed on the role of indigenous knowledge in agriculture and environmental conservation. All the 75 interviewees explained what they understood by indigenous knowledge with reference to their respective areas and even areas of specialization. What came out of the interviewees' on IK is that the knowledge is area specific, changes with the passage of time, is a preserve of the one who possess the knowledge (tacit) and can only be known by another person when he/she inquires about it. It also came out that IK is age specific, depending on what the individual experienced since birth and the area one lived in for a longer period. The idea of IK being age specific and area specific meant that IK knows no age since the knowledge may pertain to what they experienced since

birth. And if it is knowledge from the past, there is reliance on hearsay, and may be referred to as traditional knowledge. This explains why IK definitions from the younger age group did not elaborate much on in-depth aspects IK. The reason is that there is lack of a wide range of experiences.

However, in the case of the elderly interviewees, who also included chiefs and headmen, these were well-informed on IK and could give illustrative examples in agriculture and the environment. The explanations given by the elderly interviewees highlighted that indigenous knowledge is based on knowledge that has roots in the traditional lifestyles, which is referred to as traditional knowledge. They went further to explain that IK manifest itself in areas of agriculture and the environment, forming the basis of people's livelihoods in communities. In agriculture, interviewees stated that people grew small grain crops, (sorghum, pearl-millet and finger-millet) using hoes as the main cultivation implements. The elders explained that rural communities benefited from *humwe* (oneness), when conducting weeding and harvesting of crops. The *humwe* concept also applied to the cultivation of the *Zunde raMambo* (chief's granary). In terms of environmental conservation, the interviewees expressed that most of the areas they lived in during the past years; they were densely populated with big *mabvokocho* (trees and thick bushes). They credited the upkeep of the environment to the upholding of *zviera* (taboos) as well as respecting and observing of the rules set by the community leaders which forbid the wanton cutting down of trees. Interviewees also pointed to the level of obedience by most of the children who belonged to the older generations. They took heed of the elders' reprimanding when they committed offences, even if the concerned individuals were not their maternal parents. The interviewees

explained that due to high level of obedience, children would obey when warned not to cut down trees, avoid veld fires and to avoid harming aquatic life by avoiding urinating in water sources. Interviewees hinted that indigenous knowledge can still play a role in agriculture and the conservation of the environment today. Details concerning the various facets of indigenous knowledge and its role are going to be presented under the different themes as a way of addressing the research objectives and the research questions.

5.4 Themes and indigenous knowledge assessment

The term theme can be understood in different ways in the study of qualitative data presentations. According to the Oxford dictionary (2010), a theme is a subject or main idea in a talk or piece of writing. Usually a theme is a representation of a level of patterned response or meaning from the data that is related to the research questions a study at hand. On the other hand, Gery W. Ryan, (2003), explains that themes can be regarded as abstracts, often fuzzy, constructs which investigators, identify before, during and after data collection. Others such as (Bulmer 1979; Maxwell 1996 and Strauss 1997) refer to themes as products of reviewing literature or being derived from characteristics of the phenomenon being studied. They went further to say that themes come from agreed upon definitions, local common sense constructs, researchers' values, theoretical orientation and personal experience with the subject matter. In this study, the themes were crafted from a combination of topical issues under research. These include derivations from the research objectives and research questions, as well

as the local common sense construct in Gutu district and from the personal experience with the subject matter, gained over the years of living in Gutu district for a period spanning over 40 years.

The study intends to assess the role of indigenous knowledge in areas of agriculture and environmental conservation in Gutu district. The assessment is premised on the various themes relating to the research objectives. Therefore, focus is on issues such as the assessment of Gutu residents' awareness of the prevailing indigenous knowledge practices in their communities. Taken into consideration when doing the assessment, is the fact that IK is local knowledge which is unique to a given culture or society. The knowledge is referred to as unique, traditional, local knowledge existing within and developed around specific conditions by women and men indigenous to a particular geographical area (Warren, 1991). The next theme relates to the sharing of indigenous knowledge by Gutu residents and focus is on the mechanisms of tapping tacit knowledge since IK fall in that category. The other section looks at knowledge transfer, whereby focus is on the processes of imparting knowledge to recipients through verbal means or practical demonstrations of the systematic transfer of IK to future generations through different acquisition methods such as the use of folklores, riddles, proverbs, idioms, taboos and other methods. The last though not least theme is that of documenting and protecting IK. The documentation and protection of IK is a means of ensuring that the valuable knowledge is retained for posterity, ensuring that the knowledge is protected against free exploitation by those who may be better placed in terms of resources and technology.

5.4.1 Theme one: Indigenous knowledge awareness

Under theme one, the researcher sought to find out from the interviewees what they perceive to constitute IK in the communities of Gutu district. The informants gave views which ranged from simple narrations of the lifestyles people evolved through from the traditional time to the current period. The interviews conducted focused on the following:

5.4.1.1 People's views of Indigenous Knowledge

The interviewees shared different views on what they understood as IK. Elders explained that indigenous knowledge (IK) was a way of life of the people who lived in the areas where the present generations are residing today. They explained that people lived communal lives whereby homesteads formed communal compounds, grouping all the community residents together. Other interviewees were of the view that IK was the life history of people who lived several decades ago, dating back to the traditional times. The idea of tracing IK and linking it with the lifestyles of traditional people give more credibility to the fact that IK is understood in diverse ways which evolve through long and interactive processes. Bates, et.al, (2009:128), gave a comprehensive definition of IK by saying that:

'local and indigenous knowledge' refer to the cumulative and complex knowledge, know-how, practices and representations that are maintained and developed by peoples with extended histories of interactions with the natural environment. The cognitive systems are part of a complex that also includes language, attachment to place, spirituality and worldview. Many different terms are used to refer to this knowledge, these include:

- traditional ecological knowledge (TEK)
- indigenous knowledge (IK)
- local knowledge
- rural people'/farmer's knowledge
- ethnobiology/ethnobotany/ethnozology
- ethnoscience
- folk science
- indigenous science

The definition of IK given by Bates and colleagues, help in bringing out the fact that IK is all about the intricacies of the lives of human beings from the earliest times (traditional time) up to the present generations. Therefore, for one to develop an in-depth awareness of IK, it is necessary to assess the different areas in which IK manifest, such as those highlighted above.

5.4.1.2 Local knowledge

Knowledge which focuses on people's interaction with the environment around them is local knowledge. Indigenous people of Gutu have developed enormous volumes of knowledge over the centuries by directly interacting with the environment. The interaction over the years equipped people in Gutu district with knowledge about the soil, climate, water, forest, wildlife and agriculture practices. Knowledge about the climate assists the communities to know the crops which are suitable for cultivation and where to cultivate them. People also have knowledge about their environment and how best they can utilize resources for sustainability and a balanced ecosystem.

5.4.1.3 Rural people'/farmer's knowledge

The term indigenous knowledge applies to people who live in a given area and possess knowledge which may be specialized or unique. For example, Gutu communities are rural residents who have been in the area from the earliest time, passing through succeeding years in the 1930s, 1940s and 1960s which saw the creation of 'native' reserves. Therefore, the residents expressed knowledge about agriculture practices in the communities. Basically, interviewees indicated that they practice subsistence farming. The farming system concentrates on the cultivation of small pieces of land, as opposed to the practice of shifting cultivation which used to be the farming method used before segregation laws were introduced by the colonial settlers from the 1930s.

5.4.1.4 Traditional ecological knowledge

This is knowledge about the relationship between human beings and the environment. The knowledge is handed down to future generations through traditional songs, stories and beliefs (Masaka and Chemhuru, 2009). Indigenous communities have lived in harmony with the environment and have utilised resources without impairing nature's capacity to regenerate them, which is sustainable living. Indigenous knowledge shaped people's values and attitudes towards the environment, and it is these attitudes and values, which have guided their actions and made them sustainable. Therefore, indigenous knowledge helps to develop sensitive and caring values and attitudes, thereby, promoting a vision of a sustainable future (Nakashima, 2009).

IK also include knowledge possessed by people in managing the environment and its natural resources. For example natural resources are supposed to be used sparingly so that future generations can use the same resources. For the younger generations to know information about IK, it is passed down from one generation to the other through oral narratives. Some of the narratives included the use of folklores, proverbs, riddles, idioms and taboos. When the knowledgeable elders narrate folklores or speak using proverbs, riddles, idioms or taboos, the intention is to teach IK through lessons that are derived from the stories or expressions.

Further contributions on what constituted IK had one chief saying that:

Indigenous knowledge is all about our forebears, particularly about the way in which people lived a long time ago. This includes the culture of the old generations, observed in their day to day living, including the crops they grew, the methods of cultivation and also the existence of sacred places and how people respected such places in their communities and other surrounding areas (Interview with a chief, 10 May, 2011).

The information from the interview above show that sacredness was also part of IK in communities and the sacredness of places was reinforced by taboos (*zviera*) in certain places in the district. One example, cited by an interviewee was that of the sacredness of the Rasa Mountain. The interviewee explained that it was taboo for anyone to go on the mountain and gather fruits to take home. The sacred rule was that people should only consume the fruits and leave when full. Anyone who disobeyed, it was believed, would wander about the mountain. The reason for the taboo was to promote a balanced ecosystem in which wild animals have enough food in the environment so that they will not invade people's homes in search for food.

Interviewees referred to taboos which were intended to conserve wildlife, the vegetation and water sources so as to promote harmonious living in societies. Some of the interviewees explained about the nature of settlement patterns in which people lived as one group, for example, a few decades ago, people lived communally, near mountains or hills for security reasons. More so, there were land use demarcations in communities, where by there was an area for people's homes, grazing land and an area for the cultivation of crops. One elder summed up IK practices of the time by saying that:

people lived in grass-thatched houses and depended on the environment for resources to build homes and kraals for the keeping of livestock. Conservation measures were strictly observed as people exploited the environment's resources sparingly and would abide by the rules of traditional leaders in the communities. Generally, societies were peaceful as people were obedient and abiding by laws of the land (interview with a community elder, 6 July, 2011).

From the narration above, it shows that during the past years, before modern day developments, people lived in hamony with nature as well as with the leaders of the communities. IK practices were respected and that respect and proper management of resources, helped in maintaining a balanced ecosystem. However, things have changed and people have severely destroyed the forests because of overpopulation which has increased demand on the limited resources.

5.4.1.5 Indigenous knowledge peculiar to agriculture

Indigenous people in Gutu district rely on agriculture for their livelihood. The farming

methods used, evolved from the traditional rotational farming to the current state of concentrating on limited pieces of land which have become over-used. The assessment of the application of IK in agriculture focused on a number of practices which applies in crop production.

5.4.1.5.1 Crop cultivation

The interviewees narrated about the IK which dates back to the yester-year generations. For example, interviewees explained that people grew small grain crops such as *rukweza*, (finger-millet) *mapfunde* (pearl millet) and *mhunga* (sorghum), other than *chibage* (maize) which has become the popular crop grown in Gutu in recent years. The small grain crops ensure sustainability even during seasons when rainfall is limited. Other crops grown include *nzungu* (groundnuts) *nyimo* (roundnuts) and *nyemba* (peas). It was also revealed through interviewees that the Gutu communities also grew *chinyamugagu* (small seed type of maize). This type of maize was able to withstand limited amounts of rainfall, similar to the small grain crops. In order to ensure high productivity in agriculture, during the 1920s, farmers periodically used the rotational farming method. As Muchineripi, (2008:8) puts it, rotational farming involved people clearing a piece of land, grow crops for several years until the soil became depleted, then move to a fresh plot of land for the next harvest. Cultivation was mainly done through the use of the *badza* (hoe) and it was purely a manual process of *kurima chibakera* (digging using the hoe).

However, the interviewees lamented that Gutu district was experiencing food shortage just because people had abandoned the growing of small grain crops for maize, yet the

small grain crops are sustainable under adverse climatic conditions, unlike the maize crop. Chard, (2006), assessing Zimbabwe's agro-ecological conditions for regions 4 and 5, similar to Gutu, explained that the rainfall in the region is too low and uncertain for cash crops such as maize, which demand high rainfall. This is true considering that regions 4 and 5 have an annual rainfall averaging between (400 to 600 mm). Experience, spanning over years is a good yardstick of IK. The elders, who have lived in Gutu district for several years, know the type of crops which are suitable for the climatic conditions of the region.

5.4.1.5.2 Management of soil fertility

The interviewees explained that land was abundant during the 1920s, before the introduction of land segregation laws such as the 1930 Land Apportionment Act, which divided land on racial lines. Soil fertility was good although promoted through the rotation of farming land. Farmers also selected areas which were adjacent to ant-hills where soils were fertile. In other instances, farmers cultivated the crops near the foot of hills where soils were fertile due to the decayed tree leaves. Other than relying on the natural fertility of the soil, farmers also used livestock manure to replenish soil fertility. Yet another method of promoting fertility in the soil was to leave the stalks of crops from the previous harvest to decay in the fields. The system of crop rotation was also employed as a method of improving soil fertility. For example, farmers would rotate legume crops such as peas, beans and groundnuts with maize to maintain soil fertility since legumes have a natural way of fixing nitrogen in the soil.

5.4.1.5.3 Preservation of seeds/crops

The indigenous people of Gutu district used IK in the preservation of seeds to be used in the forth-coming farming season. Interviewees explained that after harvesting crops, people selected well molded grain for seed preservation. The grain crops were hanged in the huts used for food preparation so that smoke would act as a preservative against grain borers. As for the rest of the harvested crops, these were adequately dried, thrashed and stored in granaries. In preserving grain seeds, the granary walls are smeared with cow dung so that moths are repelled by the dung smell. After storing seeds in the granaries, they are completely sealed such that the grain would last for several years. The IK practices of grain preservation are still in use in spite of the availability of modern chemicals for pests, in instances where chemicals are affordable; they are used for total protection of the preserved grain seeds.

5.4.1.5.4 Control of pests, insects and diseases

The interviewees explained that people in the traditional time had different ways of controlling pests, insects and diseases which attacked their crops. One of the methods used to control diseases was to burn all the crop stalks after the harvesting period. In other instances, crops would be rotated or to use ashes which would be sprinkled in the field in order to clear aphids. The interviewees highlighted that the use of natural ways of dealing with pests, insects and diseases was much better than the use of modern chemicals since they are associated with several side-effects to people and may also affect the soil.

5.4.1.5.5 Animal rearing

Gutu communities keep livestock such as cattle, sheep, goats, donkeys, pigs and chickens. Livestock is a source of wealth which serves different purposes among those who possess the animals. They provide with draught power to farmers, though traditional times a few individuals would use ox-drawn ploughing since ownership of ploughs was a preserve of a few wealth individuals. However, cattle were used to draw home-made carts.

People managed the health of animals through the use of herbs and other natural remedies to treat sick animals. For example, interview explained that *chin'ai* (soot) mixed with water is used to treat animals which show signs of constipation, while the *muvengehonye* (maggot tree leaves) is used to treat animal wounds. The *gavakava* (aloe vera) is cut into pieces and mixed with drinking water for chickens as a way of treating coccidiosis.

5.4.1.6 Indigenous knowledge and the environment

Gutu rural communities rely on the environment for a number of provisions for the homes. Interviewees, who focused on the environment, explained how communities depend on environmental resources. For example, the environment is regarded as the source of natural resources where people collect firewood for cooking, poles for the construction of livestock kraals, poles for the fencing of homesteads, grass for the thatching of houses, fruits and edible roots, wildlife in the form of animals for meat, water from rivers and wells, as well as from natural springs. Since all the listed

resources are basic requirements in communities, there is need for the preservation of the natural resources for posterity. Some of the areas to look at include those discussed below.

5.4.1.6.1 Management of natural resources

Natural resources should be safeguarded to ensure that they are protected against total destruction. However, the situation in Gutu district has completely turned to be the opposite. Natural resources are severely depleted through deforestation, scarcity of wild-animals, silted rivers, and dry rivers, wells and springs. In one of the interviews conducted, one elder summed up the state of the environment as follows:

my child, a lot of things have changed over the years, people have become lawless and are just cutting down trees without reproach, that is why the land has lost its forests and is now barren. The other reason is that people living in our communities have increased compared to the past-years. People have also adopted destructive farming methods which are causing the siltation of rivers and dams. The scarcity of animals is due to the destruction of forests so animals got scared away to other areas which are less populated. What remains are small animals, such as hares and spring-boks (Interview with a community elder, 12 May, 2011).

The above views shows that people in Gutu district have failed to live in harmony with nature. While the earlier generations managed to practice sustainable livelihoods, the succeeding generations have caused more harm to the environment and its natural resources.

Traditional leaders shouldered the blame of the destroyed vegetation on failure by people to uphold traditional customs, values and beliefs, including taboos (*zviera*). For example, they explained that it was prohibited under traditional laws to cut down big

trees since these were associated with the habitation of ancestral spirits, thus being revered. They also stated that people had lost respect of sacred places such as the natural springs where community members were not supposed to fetch water with dirty black pots. Since the places were associated with the presence of mermaids. The defilement of sacred places led to the vanishing of mermaids and subsequently the springs dried up. While the reasons raised by chiefs are more of myths and difficult to prove, the truth behind such taboos was to act as avoidance rules which were aimed at safeguarding natural resources from being unwantonly destroyed or polluted (Tatira, 2010).

The use of taboos assisted in the protection of natural resources while prohibitive laws are meant to reduce incidences of destroying the environment since offenders will face stiff penalties such as fines and jail terms for causing veld fires. More so, it will help if people are encouraged to build houses using stones where they are available or to mold bricks. Other factors raised through focus group discussions are those which hinted on conservation measures. The proposed measures include, urging people to fetch firewood from dry tree branches than to cut down live trees for firewood. Even in circumstances where people need poles for domestic use, interviewees hinted that it should be a practice by people to select part of the tree branches than to cut down the whole tree.

The Focus group discussions corroborated with individual views on the reasons for the deterioration of the vegetation. One major reason cited is that of overpopulation which subsequently causes strain on basic community requirements such as firewood and poles for homestead use. The needs of an ever-increasing population had resulted in

the rapid cutting down of trees and complete destruction of forests leaving most areas barren. The focus group participants also unanimously agreed that due to the undermining of the sacredness associated with the management of natural resources, severe deforestation went on unchecked in most parts of Gutu district. For example, participants expressed that people had gone on to indiscriminately cut down sacred trees such as the *Muhacha/Muchakata (Parinari curatellifolia)* for firewood or medication and nutrition. The Muhacha tree is sacred since it is a preferred shelter for the conducting of *mukwerera* (rain-making ceremonies). Other participants cited the problem of turning *mapani* (wetlands) into cultivation areas, yet these areas are habitats of natural springs which provide water. Due to the numerous violations of natural resources, most areas have become barren and dry as opposed to the yester year prosperity characterized by dense forests and sprouting water from natural springs.

5.4.1.7 Challenges to indigenous knowledge practices

In the interviews conducted with different interviewees cross the age divide, both the young and elderly members of the community concurred that IK had gone through great transformations. The knowledge has evolved presenting a number of challenges to the residents. Interviewees raised a number of reasons to explain the major challenges affecting IK, particularly knowledge inclined towards the traditional era. The challenges raised are discussed in the following sections:

5.4.1.7.1 Modernity

The coming of Europeans in Africa and Zimbabwe in particular, brought up different forms of development which were different from those followed by Africans. The new

form of development came to be expressed in different terminologies such as modernity or western world development. The effects of modernity were felt by the indigenous people of Zimbabwe, those in Gutu district included. One interviewee had this to say, “Western culture is to blame for the compromising of our traditional culture. When people get educated, they think that traditional knowledge is for those who are backward and uneducated”. This sentiment blames the influence of foreign cultures as changing the perception of people on traditional lifestyle which is the basis of IK.

Another interviewee who was of an old age, was of the view that the young generations had lost focus on IK, mainly because of foreign influences acquired through the use of information and communication technologies (ICTs) such as mobile phones, television, radio and the Internet. The interviewee explained that some radio programmes were corrupting children, same applies with some of the television programmes watched by children, and also the information they search and read on the Internet, which include pornography and violence. What the youths watch tends to influence their attitudes to become wayward. IK has been seriously undermined, such that it is now a preserve of the old generations. Children no longer appreciate the consumption of food prepared from grain crops such as thick porridge made from *sadza remhunga* (sorghum grain) or the maintaining of natural resources such as trees for firewood. The youths talk of power from electricity. Modernity affected IK in that the youths have lost physical contact with the natural environment, thus failing to have hands-on with the events involved in agriculture and environmental management.

5.4.1.7.2 Christian teachings

Christianity in Zimbabwe was introduced by European missionaries who came and established a number of mission stations throughout the country. In Gutu district, the Dutch Reformed Church missionaries established a number of mission stations such as Alheit (1909) and Gutu mission (1911). According to the interviewees, people in Gutu district were following traditional lifestyles. The lifestyles even reflected in the agricultural practices people followed and the manner in which they managed the environment. There were strong influences of traditional beliefs, customs and values. Communities believed in taboos, myths and legends. However, changes began to develop when there was an increased conduct with the missionaries and the teachings they spread in communities.

While Christian teachings are not bad, the teachings by missionaries influenced those who got converted. For example, some of the teachings despised traditional practices beliefs, customs and values as pagan or heathen practices which had no place in Christian teachings. To illustrate the point, one participant cited some churches which he said were against their members from participating in traditional practices such as the rain-making ceremonies. The practice was regarded as pagan, yet to Africans, these were thanks-giving ceremonies for good harvests and to request for future successful farming seasons. Even the idea of beliefs in taboos and sacredness, church teachings regard the practices as signs of pagan beliefs which are associated with the dark world. As such, the interviewees expressed that the majority of community members who converted to Christianity, developed an attitude of shunning their traditional customs, values and beliefs.

5.4.1.7.3 Urban influence

The development of modern lifestyles saw the rise of industries in towns and due to the need for labourers, people migrated to different urban areas. The interviewees, while they appreciated the developments done by those who joined formal employment in urban areas, also lamented that it contributed to the dilution of IK practices due to other influences. The interviewees explained that the young generations who migrated to urban areas in search for jobs met with new people from different parts of the country as well as foreigners. The interactions with foreigners and other people from different places contributed to the dilution of indigenous knowledge associated with their areas of origin. It was worse with the younger generations since they are quick to emulate other cultural practices at the expense of theirs. In agriculture, for example, people are now more into

the cultivation of cash crops as opposed to the traditional grain crops. The building of modern homesteads using clay molded bricks is contributing to deforestation as people cut down live trees to treat the bricks.

5.4.1.7.4 Collapse of communal homesteads

Communities in Gutu used to have cluster homes which were referred to as communal homesteads, whereby a cluster of homes would form their own single community. The setting had an advantage in terms of sharing IK through common platforms such as the men's meeting place (*dare*). On the other hand, young women would be sited in the

cooking house, being taken through nurturing lessons given by the old and knowledgeable women. The young women would be taught the role and responsibilities expected of a future mother. The duties taught to young women include, the type of crops women should cultivate, skills in cultivating the crops, fetching of firewood and the procedures involved, winnowing of grain after it is thrashed, fetching of water from the well, just to mention those few.

The importance of the existence of men's meeting place is that it afforded the young men to be exposed to practical teachings of the tasks they were expected of as future heads of families. The teachings included areas such as the cultivation of crops, hunting skills, livestock rearing, and the management of natural resources, just to mention those few. The teachings focused on life experiences conveyed through the use of riddles, proverbs, songs, storytelling and myths.

5.5 Theme two: Sharing of Indigenous Traditional Knowledge

Indigenous traditional knowledge (ITK) is tacit in nature, meaning to say that it is knowledge which resides in people's minds. The knowledge is passed on through the word of mouth to its intended recipients, typically the manner in which oral traditions are conveyed from one generation to the other. Interviewees expressed the different ways in which IK can be shared by those who possess the knowledge, being transferred to the recipients.

5.5.1 Sharing of Indigenous knowledge

The sharing of IK is complex since the knowledge resides in the minds of individuals. If

one needs the knowledge possessed by another person, one should make an effort to extract the knowledge. Tacit knowledge should be extracted since the knowledge is not known unless appropriate steps to acquire the knowledge from those who possess it. The knowledge can be shared through practical ways. The World Bank summed up the transferring mechanisms for IK by saying that the knowledge is, “most common exchanged through personal communication and demonstration: from master to apprentice, from parents to children, from neighbor to neighbor, from priest to parish” (World Bank, 1998). The process involves the mentoring of the apprentice so that he/she acquires the knowledge through practical demonstrations. An example of the knowledge sharing procedure is when a father opens up on herbs that can be used to treat common illnesses such as using gum tree leaves to treat coughing caused by colds.

Since IK resides in the mind of individuals, those who possess the knowledge may decide to keep it to themselves since it gives the individuals a competitive advantage which can reap rewards through payment for the services. Individuals who possess unique IK are not comfortable revealing the knowledge to any other person outside the family circles.

In order to inculcate the teachings to the youngsters, the elders explained that, different methods were used such as *ngano* (folklores), *nziyo* (songs), *zvira*hwe (riddles), *tsumo* proverbs, *madimikira* (idioms) and *zvia*ra (taboos), among a variety of traditional teaching methods. Even one elderly woman corroborated what the elderly man had said in terms of the methods used to share indigenous knowledge. She expressed that:

When our parents used to teach us valuable things, they would do that while we sat around a fire-place and they narrated stories, sang some songs and used idioms and proverbs to put across important teachings.

She went further to explain that the use of taboos was meant to rein the behaviour of young children. It is the reason why clarity or explanations were not given. The grandmother gave as example a taboo which says that if one urinates in a *tsime* (well), that person was going to suffer from bilharzia. Children who knew the pain associated with bilharzia would not dare commit the offence. These were taboos meant to enforce hygienic practices from a tender age since unhygienic practices had some negative effects not only to the people who drank the water, but also to the aquatic life.

Some of the interviewees explained that IK was also shared through some practical demonstrations and this applied to practical tasks such as the cultivation of crops and the weeding process, even including harvesting and storage of the crops. One prominent farmer, specifically cited the need for practical demonstrations in the preparation of basins for conservation farming, a cultivation method popularized in recent years to combat hunger in Gutu district. This is supported by the Shona proverb which says that, “*Kugova nhaka hwuona dzevamwe*”, translated as. in order to succeed you emulate others. Other participants also cited hunting, thatching of grass huts, treatment of animal wounds, just to mention those few as activities learned by doing or acquiring the the skills or knowledge from those who possess it and are willing to share.

A total 15 out of 20 (75%) chiefs and headmen interviewed, cited the practice of bringing communal members together to work on *zunde ramambo* (chief’s granary). The

land is cultivated in order to produce grain reserves to be used when there is drought. Participants at the chief's land would take the opportunity to share important information relating to IK. The chiefs and headmen explained that participants comprised of all age-groups and usually the elders would take the opportunity to share IK. Useful information would be shared through songs containing messages to teach on good behaviour or to respect the laws of the land. At times the elderly in society took the opportunity to make people learn through the use of idioms, proverbs and riddles, which in turn sought for answers, explanations and clarity. As the knowledgeable elders explained idioms, proverbs riddles and even taboos, it was an advantage in that community members would be present in large numbers. The atmosphere offered learning opportunities as problem issues were thoroughly discussed for correct and useful knowledge to benefit all those present.

The platforms and methods suggested by individual interviewees in the sharing of IK were corroborated in focus group discussions. All the 8 out of 8 (100%) focus groups revealed that participation at the chiefs' piece of land created an appropriate platform to acquire beneficial IK since the platform allowed sharing of information through open discussions. The other suggestion which came out of focus group discussions on the sharing of IK was that the process should start within homesteads at family circles. However, 4 out of 8 (50%) of the focus groups did not agree with the view. This was mainly due to the fact that some families comprise of children, having lost both parents who should provide parental guidance to their children. There was also an interesting point raised by 5 out of the 48 members (10.4%) in all the 8 focus groups, who pointed out that the practice of cultivating the chief's land had drastically gone down in most

communities, so they did not agree that it was a platform which promoted the sharing of IK.

5.5.2 Benefits of indigenous knowledge to communities

The interviewees raised a number of benefits which they suggested could be gained through the sharing of IK. There are a number of benefits which can be derived from IK practices such as the singing of songs, use of proverbs, riddles, idioms and taboos. The songs that are sung during particular activities such as when people are weeding crops, thrashing small grain crops or when involved in community projects such as gully reclamation, are meant to keep the residents focused on the tasks. Songs also act as part of entertainment, encouraging people at work to keep working without losing interest. At times songs are aimed at correcting way-ward behaviour among residents. Other interviewees who spoke about the use of proverbs, riddles and idioms, explained that they contained hidden teachings which when explored deeper, revealed didactic lessons. Some examples cited by interviewees included proverbs like: *Svinga repwa rinonaka asi hariiswi mudura* (The green stalk of sweet cane may be sweet but it cannot be harvested and stored in a granary). Riddles were also used such as, *Tandi ndebvu akadziwanepi?*, translated as (Where does Tandi's beard grow from?). In the same vein, idioms were also cited such as, *Hope hadzina ndima* (Too much of sleep is not productive). All these expressions were meant to teach and to foster quick thinking on the part of youngsters as well as encouraging hard-working and a sense of responsibility.

Other benefits cited by the participants stated that IK helped in the grooming of

responsible and principled citizens. One elderly interviewee, who raised the point, clarified it by explaining that the teachings which were done during their childhood era were aimed at fostering good behaviour. This was achieved through teaching youngsters to be polite to all adults and even to one another, as well as urging hard-working and also the upholding of laws of the areas directed by traditional leaders. The same elderly participants expressed that the youngsters who take time to listen to IK teachings are respectful to their parents. More so, obedient children grow into responsible parents in future because they are guided by upright and morally correct principles.

5.5.3 Challenges in the sharing of indigenous knowledge

There was general consensus among all interviewees, 75 out of 75 (100%) that there were a number of challenges which are affecting the sharing of IK in Gutu communities. As earlier on noted, the sharing of IK requires certain platforms or setups which are conducive for the discussions. This starts with the family unit, that is parents and their children, or at men's sitting place, where young adults are groomed, as well as the kitchen for the nurturing of the girl child. However, there are a number of factors which have affected the setups. One of the factors cited by the elderly interviewees is that of the generation gap. One elderly man had this to say, "Young people are no longer concerned about traditional indigenous knowledge, to them they say it's yesterday's matters and so have no time listening to the teachings". This is further compounded by the fact that the young generations are now more exposed to western values, customs and beliefs hence they despise their own indigenous ways based on their traditions. Many of the younger generations as the elderly interviewees put it; spent limited time with their parents. Most of their time is now

spend at school, training institutions and thereafter, they migrate to urban areas for employment.

All these movements take the young generations away from their parents and the elderly members who can expose them to indigenous knowledge teachings or sharing of experiences. To make matters worse, one interviewee, an old woman in her eighties, lamented that, “When children migrate to urban areas, they meet all sorts of people from far away countries and they quickly emulate the ways of life of those people at the expense of their own” Even in the event that the children return home, they will always be talking and discussing about the fascinating urban lifestyles they experience, hence the rural indigenous practices have no space in their lives.

Diverse contributions came up from different interviewees involved. For example, one chief lamented the decline of IK due to factors which distract the focus of the younger generations. The issue of Christianity was one such factor, not that Christianity is bad, but only that Christianity beliefs are at loggerheads with IK beliefs and customs. People who convert to Christianity, including children, no longer subscribe to indigenous traditional beliefs, customs and values. The chief also shouldered blame on parents, especially those who spend most of their time drinking traditional beer in the company the youngsters. The chief explained that it is the root-cause of ill-behaviour among youngsters who when drunk, cease to respect the elderly, including their parents. The chief also lament the eroding of taboos due to modernity. To illustrate his point, the chief cited one particular development in the area in which a mobile-phone operator had installed a network booster on the sacred Rasa Mountain. According to the chief’s

opinion, the development had compromised the sacredness associated with the mountain from the traditional times.

Diverse views on IK were also raised by 5 out of 75 interviewees (7%) who belong to the education sector. The interviewees cited the advent of information and communication technologies (ICTs) as one major contributor to the distortion of sharing of IK among children. He explained that through access to the Internet, children and even parents were now exposed to the foreign practices which diverted their attention away from their own traditional lifestyles by opting for western-oriented ways of life. The sites which are watched may include pornography, improper dressing and rowdy behaviour which are contrary to the teachings of traditional customs and values as taught at *dare*. Similarly, there has been an abandonment of the teachings on good behaviour which used to be imparted by the elderly women in the cooking huts with children listening attentively while sitting around the fire-place. The educationists further expressed that the trend is worsened by the continuously cropping up of social network sites such as the Facebook, Twitter and Youtube which are in use today.

5.6 Indigenous Knowledge Transfer

The transfer of IK is not an easy process since the knowledge is tacit in nature, that is, it is mainly held in people's heads. As such, people should be willing to share the knowledge with those who may be interested in acquiring it (Chisenga, 2002:96). The mode of transferring tacit knowledge requires a community which speaks the same language as well as sharing underlying cultural concepts. Therefore, there is a

systematic way to the transfer and acquisition of IK. Considering the dangers that IK possessed by elderly people in the community can be completely lost if no steps are taken to secure the knowledge, there is need for the current generations to be proactive. In order to initiate the transfer process for IK, there are steps which can be taken for the holders of the knowledge to open up. This may mean use of incentives to entice the knowledge holder to open up and share the knowledge for others to benefit. Rouse, (1999) explains that for many people, IK is a livelihood. The fact that individuals who are privy to IK, means that they alone are the holders of such knowledge, thus it puts them at an advantage, and enables them to collect pay for consultations. The inquiries could be by farmers, the ill, consulting healers or pregnant women visiting the midwife.

However, there are situations in which individuals can be forth-coming with the information so that it benefits the future generations. Such scenarios involve the mentoring approach, especially where individuals confide certain information to chosen recipients. It could be a grandfather who takes out his grandchild into the bush to show him herbs which are used in the treatment of cattle wounds. The mentoring approach is usually done herbalists, traditional healers and midwives. They take along with them, their assistants, who in the end inherit the trades.

5.6.1 Mechanisms for the transferring of indigenous knowledge

There were a number of suggestions cited by the interviewees which they felt could

assist in the transfer of IK for the benefit of different members of the communities in Gutu district. The suggestions are represented in the graph below:

Table 5-2: Platforms for transferring IK

Suggested Platforms	Numbers involved	Percentages
Confiding IK to a relative	17 out of 75	23%
Teaching of IK in schools	28 out of 75	37%
Use of modern technology (radio, television and recordings)	8 out of 75	11%
Setting up of IK Resource Centres in communities	12 out of 75	16%
Homestead (e.g. at men's meeting place and in cooking huts)	10 out of 75	13%

From the interviews it emerged that participants suggested more than one preferred platform for the sharing, transferring and acquisition of IK. Basing on the figures and percentages in the above table, 17 out of 75 interviewees (23%) was comprised of traditional healers, herbalists and midwives, mainly because they regarded their knowledge as unique hence a preserve which should be priced, and cannot be openly shared. The 28 out of 75 interviewees (37%) were comprised of farmers, chiefs, teachers, Veterinary and Agriculture and Extension Officers and a cross section of other community members. They suggested the teaching of IK in schools since it would involve all the children, even those who do not have opportunities to learn from homes. Those who suggested the use of information and communication technologies (ICTs)

such as radios and televisions, 8 out of 75 (11%) comprised of teachers, Veterinary and Agriculture and Extension Officers. The suggestion could have been influenced by the availability of programmes on the radio and television which involve some of their membership, for example *Murimi wanhasi* (Today's farmer). The 12 out of 75 (16%) of the interviewees, who suggested the setting up of IK resource centres, comprised of chiefs and the some of the elderly members. The possible reasons for their suggestions are that, chiefs as the custodians of IK in the areas under their control, it would promote their roles of encouraging the continued existence of some valued African traditions through the help of knowledgeable elders in the communities. Last though not least, the 10 out of 75 (13%) of interviewees who suggested the sharing of IK at homesteads, comprised partly of chiefs, farmers, herbalists, midwives, the elderly and traditional healers. The possible reasons are that chiefs as custodians of indigenous values, customs and beliefs wanted the teachings to start at family level as it would involve several homesteads. Others like herbalists, midwives, farmers and traditional healers were interested in safeguarding the preserve of their knowledge by strictly sharing it with inner family members at their homesteads.

Participants in focus group discussions raised some interesting views on some factors which they said, acted as stumbling blocks to the sharing of IK from those who possess the knowledge, down to the intended recipients. They cited factors such as individualism and the commercialization of IK by individuals for a competitive advantage. Selfish tendencies destroyed communal values, as

individuals opted to confide in close family members. The sentiments can be compared to what Nakashima et.al, (2012) expressed that, if indigenous perspectives are incorporated as part of the tertiary level curriculum, it is important in cultural studies and science. They argue that students will develop:

- An increased respect and understanding of other cultures
- An ability to think more broadly when exploring social and environmental problems
- An awareness of the relationship between people and their environment
- Knowledge on crops to be grown on certain types of soils (Nakashima, et.al. 2000: 12)

5.6.2 Benefits of indigenous knowledge transfer

The participants who were interviewed on the benefits of IK sharing and transfer are presented in (Table 5.3) above. In order to appreciate the benefits that are associated with IK, one has to realize that sophisticated knowledge of the natural world is not confined to science. Instead, societies have developed sets of experiences and explanations relating to the environments they live in. The knowledge gained by people concerning their surroundings is useful when applied to agriculture and animal husbandry, hunting, fishing and gathering as people strategize to cope with the environment (Nakashima, et.al. 2000). The other benefits which are associated with IK include an understanding of the knowledge's different perspectives. Indigenous knowledge is the local knowledge that is unique to a culture or society. Other names for it include: 'local knowledge', 'folk knowledge', 'people's knowledge', 'traditional wisdom' or 'traditional science'. The

knowledge is passed down from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain societies in many parts of the world. Indigenous knowledge helps people to live sustainably (Nakashima, et.al. 2000).

5.6.3 Indigenous Knowledge Documentation and Preservation

Knowledge documentation and protection is a means of ensuring that valuable knowledge is retained for posterity and against free exploitation. Indigenous knowledge which has generally been passed from one generation to generation by word of mouth is in danger of being lost unless it is formally documented and preserved. According to Warren (1992), the future of IK that reflects many generations of experience and problem solving by thousands of ethnic groups across the globe is uncertain. The rapid change in the way of life of local communities has largely accounted for the loss of IK. Younger generations are undermining the utility of indigenous knowledge systems. Thus, it is obvious that if IK is not recorded and preserved, it will be lost and remain inaccessible to other indigenous systems and to workers targeting development in local communities. As Warren (1991:2) explains, 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 (World Bank, 1998). Thus a better appreciation of IK is crucial to local-level development.

The interviewees in this study had varied suggestions on how best IK could be documented and preserved for the benefit of future generations. Since the researcher

was using a tape recorder to record the interviews, the informants suggested that the idea of recording their views would be a good method of preserving the knowledge. Nuwanyakpa et.al, (2000:5), are of the view that, the recording of IK from those who possess it is a method used to capture tacit knowledge. For instance, the strategy was used with remarkable success to document the natural and supernatural healing practices of the Fulani pastoralists in the north-west province of Cameroon. Other interviewees suggested for the establishment of indigenous resource centres in the communities. The centres would then be managed by selected elderly members with knowledge on different issues about local knowledge in areas of agriculture, animal health, and conservation just to mention those few. If the idea can be expanded to national level, it would go a long way in promoting the collection, documentation, preservation and ultimate dissemination of IK for the benefit of future generations. While the aforesaid suggestions were raised, there was also the challenge of IK being tacit in nature, that is it resides in people's minds and is not readily available. Some of the interviewees felt that the knowledge they possessed could not be shared outside the family circles, hence it is a preserve of those they confide to.

5.6.4 Retention of Indigenous knowledge

There were different contributions from the interviewees on how best to retain IK for the benefit of future generations. All the 75 interviewees expressed different strategies which could be adopted for the retention of IK in Gutu district. A total of 8 out of 75 (11%) of interviewees suggested that IK should be recorded from the knowledgeable elderly members and well informed individuals in the communities. There were 28 out of

75 interviewees (37%) who suggested that IK should be incorporated in the school curricula, even from primary level education, right up to tertiary level. On the setting up of IK resource centres, 12 out of 75 (16%) came up with the suggestion. There were 17 out of 75 (23%) who were of the view that IK should strictly be kept within the family circles since the possession of the knowledge offered some competitive advantage with monetary benefits.

5.6.5 Indigenous knowledge and education

The educational methods which apply to IK are area specific and are accepted after a long period of experiences and observations. For example, the people of Gutu district have realized that they continuously face food shortages as long as they grow maize instead of small grain crops. This is because they have the experiences over the years. Another aspect of IK education is that, through observing the tell-tale signs of the weather, the youths learn about the connectivity of the environment and humanity. For example knowledgeable elders would explain that if a day begins with mist coverage, it is an indicator that it is going to be a hot day. Another example is that, when there is absence of dew in the morning during the summer season, it is a sign that rains are not far away. Within a few days of the signs recurring, rains will fall. This type of IK continually accumulates into a body of knowledge which is preserved in order to be shared with successive generations.

5.6.6 Indigenous Knowledge and Intellectual Property Rights

The utilization of IK particularly in terms of its protection under intellectual property rights has always been an issue of intense debate. Intellectual property rights are rights given to a person over the creation of their minds. In law, intellectual property rights should give exclusive rights over the use of one's creation for a certain period of time. In Zimbabwe, while there are laws such as the Traditional Medical Practitioners' Act of

1981 (Chapter 79), the Act does not openly acknowledge traditional medicine as a professional discipline which can have laboratories to run parallel or to complement conventional medicine in hospitals. As such, the act which is available for use by IK holders is the Copyright and Neighbouring rights Act (Chapter: 05). The Act provides individual rights related to IK since it covers all areas including patents, trademarks and copyrights. One can argue that the Act covers IK since it provides for the protection of folklores. However, it should be pointed out that the IP laws in Zimbabwe are not as comprehensive as is the case with laws which protect indigenous knowledge systems (IKSs) in countries such as South Africa, Botswana and Namibia (Mukuka, 2010). The Copyright and Neighbouring Act mentions in passing the protection of folklore, which compromises the Act's protection of IKSs in Zimbabwe.

Since IK is tacit in nature and is a preserve by some individuals, it may be necessary for the individuals to gain something out of the knowledge they possess. The reason is that individual knowledge is unique and therefore is a priced possession, of which when needed, consultation fees should be paid for the services. This is similar

to the benefits the San groups in South Africa and Botswana have gained from the hoodia patent. The hoodia is a succulent plant commonly found in the southern Africa region. Hoodia plants are leafless succulents with thick fleshy finger-like stems which branch near the ground, Van Wyk and Gericke (2000: 70). The hoodia has appetite and thirst suppressing qualities hence it was used by the Khoisan when they went out on long hunting expeditions. Other than the afore-mentioned qualities, the hoodia could be used to treat indigestion, hypertension, diabetes, and stomach ache, Van Wyk and Gericke (2000: 70). The qualities drew the attention of a number of international agencies from across the world to test the qualities in the laboratories and found them to be valid. The San successfully negotiated for share profit in 2002 in which they receive 8% and 6% for milestone payments and royalties respectively, (WIMSA 2003/2004: 54).

As if to complement the above breakthrough, 65 out of 75 interviewees comprising 87% were of the view that IK should be protected under the law. This implies that those individuals who possess IK should realize that the knowledge can offer them a competitive advantage in rewards which come as a form of payment. Even in circumstances in which the knowledge is recorded, processed and documented to be made available for research, the originators of the information should be rewarded accordingly.

5.6.7 Propping up of indigenous knowledge: whose responsibility?

The issue of who should be responsible for the propping up of IK in the communities drew responses which can be represented hierarchical in terms of who has the greatest role to play. See the (table 5.3):

Table 5-3: Promoters of IK in communities

Responsibility Rating	Number of respondents	Percentages
Chiefs and headmen	35 out of 75	47%
Knowledgeable elders	20 out of 75	27%
Parents and guardians	10 out of 75	13%
Government (IK resource centres and School curricula)	10 out of 75	13%

Information contained in (table 5.4) above show the views which interviewees gave as to who should be taking the leading role in promoting IK dissemination in Gutu district. Chiefs topped the list on the basis that they are the custodians of traditional values in the society and also that they hold positions of authority in society hence their views can be respected. As for the elderly members, it is well known that in traditional societies, older people receive the greatest respect as it is believed that elderly people have accumulated wisdom and knowledge over the years. They act as knowledge stores for the society. Parents and guardians come third in the hierarchy just because information for decision making and planning in communities comes through the male head of the household. Thus if it is IK being disseminated, it can be effectively circulated among many people. For example, information on environmental conservation will flow faster when sanctioned by the chief. Last though not least, the government through parliamentarians can come up with policies which promote IK preservation and dissemination at community and national level.

5.7 Focus group discussions: Indigenous knowledge in weather forecasting

The focus group discussions held with Gutu community members was aimed at establishing the knowledge people have gained through interaction with their natural surroundings. For example, people in Gutu communities are able to make deductions from the behavior and signs of animals, birds, insects, creatures and plants in detecting and responding to changes in the atmospheric conditions. More so, people in Gutu rural communities have relied on the interpretation of celestial bodies like stars, the moon and prevailing winds to forecast weather conditions. By observing the behavior and signs done by birds, animals, creatures and insects and on celestial bodies, Gutu communities plan and prepare for the agricultural seasons accordingly.

5.7.1 Birds associated with weather forecasting

Information gathered through focus group discussions revealed IK based on certain birds' behavior in weather forecasting. Table 5.4 contains the details.

Table 5-4: Birds associated with weather forecasting

Bird	Behaviour	Forecast	Number of respondents	Percentage concurrence %
Haya (Rain cuckoo)	- Cuckooing continuously in summer - Cuckooing sporadically in October - Cuckooing frequently in October/November - Cuckooing during the night	- Rains expected in 1-2 days - Rain season about to begin - Good rainfall season expected - Rains expected to come soon	45/48	94%
Dendera (Ground hornbill)	- Hooting in the morning - Hooting anytime of the day	- Drizzling weather in a day or two - Imminent cold weather	41/48	86%
Dahwa (Night jar)	- Singing	- Imminent/impending rains	37/48	78%
Swoworera (Migratory stock)	- Presence in large numbers	- Good rainy season	41/48	86%
Gunguwo (Black crow)	-Crewing very early in the morning	- A very hot afternoon is expected	41/48	94%
Chivangazuva (Tinker bird)	- Singing	- Very hot days expected	44/48	91%

Information in table 5.4 is based on views and suggestions of 48 participants in all the 8 focus groups. The participants gave information about the behaviour of certain birds and the weather forecasted. An average of 88% concurred on what each bird's behavior implies about the forecasted weather. The meaning of the information is that communities in Gutu utilize IK in planning for the farming season. However, considering a 12% difference on the average responses, the percentage represents views of individuals in the groups who believe in modern ways of forecasting the weather as

provided by the meteorological department and transmitted through the radio, television and newspapers.

5.7.2 Animals associated with the prediction of the weather

Participants in the focus group discussions also revealed that animal behaviour also contributed to weather focusing. The information is captured in (table 5.5) which represents animal behavior and weather forecasting. Animals which are commonly found in homes such as cattle and sheep were also cited to explain the weather prediction through the behavior they exhibited. For example, 36 out of 48 of the focus group participants (75%), explained that when cattle are sniffing the air in the summer season with heads raised up, it is a sign that immediate rains are going to fall. As for the weather prediction derived from sheep's behaviour, 30 out of 48 focus group participants (63%), explained that when sheep huddle together facing one direction, it is an indication that a dangerous storm is approaching from the direction they are facing. Similarly, wild animals exhibit their own type of behavior to predict weather as is presented in (table 5.5). The instincts in animal behavior is also cited by Sivotwa, et.al, (2007) in Planet Ark, (2004) when they argue that animals have the ability to predict disasters as what happened in 2004 where animals seemed to have escaped the Indian Ocean tsunami which claimed 24 000 lives. This adds weight to the notion that animals possess a "sixth" sense for predicting seasonal occurrences and impending disasters. Details are summarized in (table 5.5):

Table 5-5: Animals and weather prediction

Animal	Total frequency	Percentage %	Behaviour/sound	Weather indication
Cattle (Mombe)	36/48	75	Sniffing the air with heads raised up	Immediate rains to fall
Sheep (Hwai)	30/48	63	Huddling together facing one direction	A dangerous storm is approaching from the direction the sheep are facing
Rock duiker (Ngururu)	23/48	47	Continuous singing and jumping around	Imminent heavy rains to fall
Baboons (Makudo)	24/48	50	Raising their heads towards the direction of wind	Rains expected within hours
Monkeys (Tsoko)	24/48	50	Moving in large troops	A good rainfall season
Goats (Mbudzi)	35/48	73	Bearing a lot of kids	A wet season with lots of rainfall

5.7.3 Insects and creatures observed in weather forecasting

The types of insects and creatures which were cited under different focus groups were similar across the whole of Gutu district. The insects and creatures include cicadas, termites and ants, jerymunglum, millipedes, crickets and frogs. The participants showed similar knowledge on the weather patterns predicted by the insects and creatures. For details see (table 5.6):

Table 5-6: Insects/creatures and weather prediction

Insect/Creature	Total frequency	Percentage %	Behaviour/Sound	Weather indication
Jerymunglum (Dzvatsvatsva)	44/48	91	Moving restlessly at night	Rains are expected to fall anytime
Termites (Zviteza)	45/48	94	Stock piling of grass	Drizzle or rainy weather expected the following day
Cicada (Nyenze)	45/48	93	Singing loudly in large numbers	Very hot weather for the day
Crickets (Makurwe)	41/48	86	Singing loudly in large numbers	Rain will fall in 1-2 days
Frogs (Matatya)	44/48	91	Producing sharp shrills. Bull frog croaking with high tone	Its either drizzle or heavy rains the following day
Millepedes (Mazongororo)	28/48	59	Moving in large numbers after a rain spell	Wet conditions to persist for some days
Ants (Mhamhasi)	44/48	91	Appearing in large numbers	Heavy rains in the near future
Grasshoppers (Mhashu)	40/48	83	Appearing before the onset of the rain season	Rains are expected soon like in a weeks' time

5.7.4 Celestial bodies as weather forecast indicators

There was also a general corroboration on the weather forecast indicators deduced from the celestial bodies (the sun, moon and stars). Of the 48 participants in the 8 focus group discussions, 41 of the participants (86%) expressed knowledge of the outlook signs associated with the sun features in weather forecast. As for the outlook signs associated with the moon, 45 out of 48 participants (94%), expressed awareness of what the moon features on weather prediction. As for the significance of the stars, 41 out of 48 participants (86%) showed knowledge of the weather predicated. See (table 5.7) for details:

Table 5-7: Weather forecast indicators based on wind and atmospheric appearances

Celestial body/Weather	Observation	Forecast/Prediction	Frequency	Percentage %
Sun	Presence of halo around the sun	Heavy rains expected in the immediate future	41/48	86
	Occurrence of an eclipse	Predicts good chances of rains likely to fall		
	Very hot in October	Promises of a rainy season		
Moon	Halo around the moon	Abundant rains expected	45/48	94
	Appearance of 1 st and last quarter of the moon	Good chance of rains likely to fall		
	Full moon	Rains unlikely		
	No moon	Enhanced chances of rain falling		
Stars	Few stars appearing	Rains about to come	41/48	86
	Big shining star in the western side	Good rains likely to fall		
	Big shining star in the eastern side	Drought expected		
	Plenty of falling stars	Drought expected		
Wind	Presence of whirlwind in August	Signifies early rains	41/48	86
	Northerly becoming southerly	Rains expected soon		
	Easterly to westerly	Cloudy conditions or drizzle the following day		
	Prevailing easterly wind for a long time	Drought expected		
Atmospheric appearances	Haze weather in August	Heralds early onset of hot conditions	44/48	91
	Haze weather from September to early November	A good rainfall season expected		
	The occurrence of mist in the morning	A hot afternoon is expected		
	Presence of morning dew	No rains expected on that day		
	Absence of morning dew	Conditions for rainfall are favourable		
	Very hot and humid conditions in summer	Signifies good chances of heavy rains		
	Rainbow appearing just before the falling of rains	Indicates failure of the promising rains		

5.7.5 Wind direction and atmospheric appearances as weather indicators

Wind is the perceptible natural movement of the air, especially in the form of a current of air blowing from a particular direction and the air has the effect of bringing change to the weather. Whatever changes brought about by the blowing air (wind), the developments which follow are reflected in the atmosphere, which is a layer of gases surrounding the planet earth. With reference to the information gathered from the focus group discussions, 44 out of 48 participants (91%), showed knowledge of the significance of the sky appearances at different times of the year. For example, participants explained that in Gutu, when the atmosphere appears haze at the beginning of August, it is an indication which marks the beginning of the hot period before the summer season.

When the same haze conditions appear from end of September into early October, the signs will be pointing towards a good rainfall season.

The same focus groups had 41 out of 48 participants (86%), showed knowledge of the forecasted weather from winds which prevail at certain times of the year in Gutu district. For example, when there are numerous incidences of whirlwind in August, people explained that it signifies an early onset of the rainy season. While the normal rainy season starts around mid-November in Gutu district, the prevalence of whirlwinds in August may mean to say that the rainy season can begin around end of October. The participants also hinted that the chances early rainfalls are enhanced when the prevalence of the northerly winds suddenly become southerly around mid-October. However, if there are persistent easterly winds prevailing for a long time, it is an indication that there is likely to be drought. Refer to (table 5.7) above for the details.

5.7.6 Vegetation as weather forecast indicators

Vegetation is a general term that refers to the plant life that covers the ground. The vegetation in Gutu district is generally characterized by thinly scattered trees, bushes and overgrazed land, under arid and semi-arid climatic conditions. Participants cited several tree species which they read signs from as a way of forecasting the weather in Gutu district, see (table 5.8) for details. I will choose tree species of which participants reached a deadlock on what their signs meant in weather forecasting and also the tree species which participants overwhelmingly concurred on what the signs meant in weather forecasting. Participants' views were deadlocked 24 out of 48 participants (50%) for meaning of signs from the *mupfura* (marula tree) and the *muchakata* (*parinari Curatellifolia*). Participants were deadlocked on the fact that when both the marula and parinari trees had abundant fruits, 50% were of the view that it was an indication of drought, while the other 50% were of the view that good rains were likely to fall.

The other tree species such as the *musasa* (*brachystegia*) and *muuzhe* (*brachystegia glaucescens*), when they develop plenty of new shoots, 45 out of 48 participants (94%) agreed that good rains were likely to fall during the farming season. The same 94% of focus group participants agreed that when there is plenty of *pfumvudza* (spring foliage) on trees, good rains were likely to fall during the farming season. The other plant is the *gavakavaka* (aloe vera), of which 28 out of 48 participants (59%) explained that when the plant blooms in summer, it is a sign that the rains are going to fall in a few days' time. But when the same plant produces red and green flowers, it signifies drought.

Table 5-8: Vegetation indicators and weather forecasting

Vegetation identity	Observed signs	Weather forecast	Number of Focus Group Participants	Percentage frequency %
Marula tree (Mupfura)	Abundant fruits	Equal chances of drought or wetness	24/48	50
Parinari Curatellifolia (Muchakata)	Abundant fruits	Equal chances of drought and wetness	24/48	50
Vitex mombassae (Mutsvubvu)	Abundant fruits	A good rainy season expected	37/48	78
Azanza garkeana (Mutohwe)	Abundant fruits	Good rainfall season expected	36/48	75
Uapaca kirkiana (Muzhanje)	Abundant fruits	Good rainfall season	41/48	86
Ficus capensis (Muonde)	Plenty of fruits	A good rain season	37/48	78
Berchemia discolor (Munyi)	Plenty of fruits	Good rainfall season	41/48	86
Mulberry tree (Muhaburosi)	Plenty of fruits	A good rain season	45/48	94
Syzygium guineense (Mukute)	Plenty of fruits	A good rain season	44/48	91
Aloe tree (gavakava)	Blooming Producing red and green flowers	Imminent rains Signifies a drought season	28/48	59
Brachystegia spiciflora (Musasa)	Plenty of new shoots	Good rainfall season expected	45/48	94
Brachystegia glaucescens (Muuzhe)	Plenty of new shoots	Good rainfall season expected	45/48	94
Spring foliage (Pfumvudza)	Plenty of spring foliage on trees	Good rainfall season expected	45/48	94

Over and above all, the information which came out of participants in Gutu communities regarding their understanding of the significance, signs, sounds and behaviours of

animals, insects, and creatures in forecasting the weather, show that IK is relied upon in planning for the agricultural season in rural communities. The reason why the communities look at the different meanings from nature (vegetation) and its inhabitants (animals, insects, birds and creatures) is for people to be able to timeously embark on different activities such as the clearance of the land for the forth-coming farming season. This is because the signs help in forecasting the likely weather and roughly how far rains may start to fall, see (table 5.4) for the bird sound indicators. Since signs derived from the vegetation are relied upon by the Gutu communities in weather forecasting, it explains why chiefs and headmen in Gutu district have come up with a law that criminalizes the cutting down of trees. If an offender is found guilty of cutting down big trees, they pay a fine of a goat.

5.7.7 Transect walks

The walks assisted the researcher to make objective assessments on what the interviewees raised during individual and focus group discussions. The researcher carried out observations during the four months of field work. The observations focused on assessing the state of the vegetation, crops grown, cultivation methods, harvesting and preservation of the crops. The observations established that in agriculture, people grew maize at the expense of small grain crops. Part of the observations also noted that land preparations started around end of July up to September and involved the clearing of the previous season crop stocks. Other land preparations observed involved the preparation of planting basin used under conservation farming. The researcher also passed through areas with insects such as *nyenze*. (Cicada). The insects' singing is an indication of the end of winter, marking the beginning of the hot season in August.

Animals observed include the *makudo* (baboons) and *tsoko* (monkeys) but the time of carrying out the observations were in August and could not reflect what should have been observed during the rainy season. The weakness in the observations was overcome through relying on information shared by group participants who come from areas where the presence of baboons and monkeys is high such that the people have adequate knowledge of the animals spanning over several years.

5.7.8 Observations

The observations were comprehensive since I started observing from day one of getting into the field and the process went on for four months which is the period I spent collecting data. The comprehensiveness of the observations was premised on the use of an observation guide, with focus on activities such as land preparations, crops grown, animal rearing, vegetation and the environment's natural settings, (See appendix 4) for details. The observations were done in the communities where people carried out agriculture and interacted with the environment. Since people were going about their usual community businesses, it gave the researcher the advantage of observing a natural setting in which activities unfolded in the usual and normal way.

5.7.8.1 Land preparation

Observations done under agricultural activities focused on a number of activities. These include land preparation during the off-season period, whereby farmers ploughed their pieces of land as a way of covering up the old plant stalks into the soil so that they contribute to manure in the soil. Other farmers were observed being busy with the digging of planting basins for conservation farming. The researcher also observed that after crops were harvested, stalks for small grain crops were left in the field until clearing started around end of July when land preparation begun. At times the stalks were consumed by animals since domestic animals roam freely during the period after harvesting is completed. Some of the people were involved with the digging and spreading of ant-hill soil in their fields in order to boost soil fertility.

5.7.8.2 Animal rearing

The researcher observed that people kept different types of animals which include cattle, sheep, goats, donkeys and pigs, as well as chickens. In terms of the upkeep of the livestock, those animals which fell sick were either attended to by the veterinary officers or people with knowledge on the use of indigenous herbs would make use of those to treat wounds and to dose the animals in order to clear worms and infections in the stomach. A number of treatment methods which relied on IK were suggested by knowledgeable individuals. For example, *gavakava* is cut into small pieces and mixed with drinking water for chickens as a way of treating *chitosi* (coccidiosis). Another medication procedure for animals showing signs of constipation is to soak *chin'ai* (soot) from smoked grass in cooking huts and administer the mixture to a sick animal. The sick

animal would get better within a day of treatment. As for the treatment of animal wounds, the knowledgeable individuals suggested the use of leaves of a shrub called *muvingahonye* (maggot killer leaves). The leaves are pounded and mixed with a little bit of water so that the juice is used to treat the wounds of an animal. Within a week, the wound will be showing signs of complete healing, since the medication helps in naturally extracting maggot from the wound and quickens the healing process.

5.7.8.3 Vegetation

As the researcher went around the district gathering data from participants, he observed that most areas in the district had become barren due to severe deforestation. The observations corroborated what other participants had stated that people had indiscriminately cut down trees without reproach. The communities in Gutu depend on the resources from the environment. For example, people gather firewood, poles to fence homesteads, roofing poles for huts and wood for the handles of domestic implements such as the *mapadza ekusakurisa* (weeding hoes). In spite of the depleted vegetation, the researcher observed that some conservation measures were being put in place in the form of plantations comprising of indigenous and exotic trees. For example, with the help of Chief Chitsa, the researcher observed a sizeable piece of land that was paddocked to conserve vegetation, mainly comprising of indigenous trees, especially those which are severely depleted in the chief's area, such as the *musasa* (*brachystegia*) and *muuzhe* (*brachystegia glaucescens*)

5.7.8.4 Water sources

The general observations done in most parts of Gutu district showed that water sources have become dry. For example, small and big rivers and dams have been affected by siltation to the point that they only keep water during the rain season. The level of siltation is so serious such that when it rains, the rivers experience 'flash floods', whereby rivers only flow for a short duration after the falling of heavy rains. It was also observed that wells were drying up as soon as the rainy season is over, other than at the peak of the hot season when the water-table usually goes low. Other natural water sources such as springs no longer exist, most likely due to poor usage of land such as *kurima mumapani* (cultivating of vleis). It was also observed that the winter cropping which used to be done in wet areas is no longer viable due to the drying of vleis. As an alternative, the Gutu communities in the north-eastern and south-western areas of Gutu district are using irrigation water from the Ruti and Munjanganja dams which are major dams in Gutu district.

5.7.8.5 Land utilization

Gutu district has evident signs of land over-utilisation which reflect in the form of overgrazed land and deforestation. The main reason for the strained natural resources is due to overpopulation which has created an imbalance between people and the natural resources. The situation has changed from the traditional practices of rotational farming during the 1920s before the introduction of land segregation laws. The land segregation laws include the Land apportionment Act of 1930, the Land Husbandry Act of 1951 and the land tenure Act of 1969. The laws divided land into European and

African land thus leading to the creation of reserves under which Gutu district fall. The situation in Gutu district today is that one of competing forces whereby available resources are outnumbered by people's needs, both in agriculture and the environment.

5.8 Summary

The data presented in this chapter were gathered through face-to-face interviews, focus group discussions, observations and transect walks. The data gathering methods used were intended to survey from interviewees, the role of indigenous knowledge in areas of agriculture and environmental conservation within Gutu district. To analyze the data, the researcher mainly used the qualitative approach, whereby participants' views were presented according to themes which addressed the research questions. In some instances, views and opinions were quantified in order to measure consensus or lack of it and explain the variations. The analysis of data, in some instances, purposively grouped interviewees, (for example, traditional healers, herbalists and midwives). That way, it assisted in focusing on the roles played by each participant at individual or group level, either in agriculture or the environment. The data presented, indicated that while indigenous knowledge can be useful in areas of agriculture and environmental conservation, there were serious down turns which have eroded IK practices in rural communities such as Gutu district. The younger generations are no longer concerned with IK. To the youths, IK is some kind of practice which is backward and static to put it in their words. The high prevalence of rural-to-urban migration means that the youths are no longer spending more time with the knowledgeable elderly members in rural areas.

This means a loss on the younger generations who reside in an urban environment While in the urban areas, youths learn new cultures which do not advance IK in any way. The factor of climate change is also distorting IK in rural communities and that seems to be happening with no adjustment to animals, birds, insect and creatures' behaviours. The same climate change factors are confusing local communities whose IK indicators appear to be deceiving them as agricultural seasons continue to fluctuate. The data were presented in tables mostly because tables were found suitable to represent qualitative data. The findings presented in this chapter formed the basis of the next chapter. The next chapter is there to show how the findings are either corroborated by what other scholars have written or there are new trends emerging which can help in highlighting emerging changes to what the Gutu communities used to benefit from basing on IK of the areas where people lived for several years dating back to tradition.

CHAPTER SIX

6 FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter focuses on the discussion of the findings which came out of the data presented in chapter five. Durasaro (1985:167) expressed that the discussion of research findings reflect more on personal experiences, perception and creativity. He, Durasaro, (1985) went further and said that the discussion of the findings help the researcher to draw some intelligent and logical conclusions. To achieve this aim, guidance was derived from the research objectives, (Chapter 1: Cf 1.8) which helped to formulate the research questions (Chapter 1: Cf 1.9) and answered through the collected data. The discussion of the findings is based on the following themes:

- Awareness of the different types of Indigenous knowledge peculiar to agriculture and conservation of the environment;
- Challenges to indigenous knowledge utilization in agriculture and the environment;
- Constraints to IK acquisition, sharing and transferring; and

- Strategies for enhancing IK appreciation, promotion and protection for posterity.

Since the data was gathered through face-to-face interviews, focus group discussions, and observations which were aided by transect walks, there is need to clarify factors related to the participants' profiles, gender, education and duration of staying in Gutu district.

6.2 Interviewees' Profiles

The face-to-face interview guide began with the participants' profiles. Information derived from the sampled interviewees' profiles showed that 54 out of 75 participants (72%) were males, while 21 out of 75 informants (28%) were females. The respondents were aged between 30 and 96 years, an indication which shows that the possession of IK cuts across all age groups, the young and the old. Factors considered in choosing the informants included duration of continuously staying in an area, as this gave the advantage of possessing better IK of an area. For example a 30 year old who has stayed in an area since birth, showed better knowledge of the area they lived in than one who was older, but new to an area. The elders, who were knowledgeable, exhibited flair on local knowledge based on what they experienced during several years of involvement in agriculture and the environment of Gutu district.

The differences in numbers between males and females were due to the fact that in Gutu district and several other areas in Zimbabwe, males are the heads of families and have the responsibilities of attending to inquiries at home. Women only participate when the inquiries concern them or they have better knowledge of the subject.

The researcher also assessed the educational status of the interviewees. This was intended to gauge whether one's educational level could influence their perception towards IK. The findings showed that 61 of the 75 interviewees were literate while 14 were illiterate, giving 81% and 19% respectively. However, from the findings the issue of education was found to have no influence on individuals' knowledge of IK as it proved interesting to realize that even those individuals who were illiterate were able to significantly contribute valuable information on IK. This is because tacit knowledge resides in people's minds and is knowledge gained through years of experiences in the same geographical area with a common culture. The hidden nature of IK was noticed in the behavioural exhibitions by interviewees such as traditional healers, herbalists and midwives. Traditional healers and herbalists revealed that some of the herbs they used in their practices are revealed to them through dreams. Therefore knowledge which comes in the form of dreams can never be known by another person except when the one who possess the knowledge decides to reveal the knowledge to the other person. Other means of acquiring IK include the use of songs, folklores, proverbs, riddles, and idioms. This was done at different platforms such as the *dare* (men's meeting place) and those knowledgeable, discuss and share with youths the meanings of songs, proverbs and folklores which teach about agriculture and the environment. Women had similar inductions in *imba yokubikira* (cooking hut) with the girls. Other platforms include communal gatherings such the *zunde ramambo* (chief's granary). As the people go through the work, the platform affords participants to share knowledge in agriculture and how to conserve the environment.

6.3 Sources of Indigenous knowledge awareness

The knowledge is based on experience, is tested over centuries of use, is adapted to the local culture and environment and is dynamic and changing. Bates, et.al, (2009) use a number of names such as local knowledge, traditional ecological knowledge, rural or farmer's knowledge and indigenous science when referring to IK, and this shows that IK is embedded in a number of community practices.

From the data gathered for this research, participants, though were not as comprehensive as in the scholarly definitions, they highlighted similar inferences. The views of the elders, 10 out of 75 interviewees, comprising (13%) stated that IK was

Knowledge of the older generations passed down to them through the word of mouth, from one generation to the other. The elders explained that the knowledge was useful to different facets of people's lives such as agriculture and the management of the environment's natural resources. The knowledge shared by elders included the traditional rotational farming procedures, cultivation of small grain crops as opposed to the current cash crops, the use of environmental ethics of taboos as a way of conserving natural resources. Similarly, chiefs and headmen, 20 out of 75 interviewees (27%), corroborated the elders' views that IK was derived from the yester year generations, who lived in the areas where people are settled today. Grenier (1998) also explained IK as knowledge which has been developed by women and men in a particular geographical area. It was also interesting that even the younger generations were able to link IK with yester year lifestyles passed down to them through narratives of the elders.

What the continuity suggests is that oral transmission of information creates links with the past lifestyles for the groups which prefer continuity of some practices. The elders, who shared information of the past, were combining what they experienced as they grew up and what was passed down to them through oral traditions.

6.4 Indigenous knowledge and agriculture

The data gathered was specifically addressing the role of IK in agriculture and the conservation of the environment, although information on the environment, (referring to areas not under crop cultivation) will be presented after addressing aspects on agriculture. The interviewees dwelt on a number of aspects relating to indigenous agriculture as practiced years back and what is happening in the present day. The elders explained that people cultivated the land

manually, *kurima chibhakera* (digging the land using hoe). The interviewees also explained that people mostly grew the small grain crops such as sorghum, finger millet and pearl millet. However, one chief, made reference to the *chinyamugagu*, a small-seed maize type, which was grown in communities because of its drought tolerance qualities. However, the same interviewees lamented the high prevalence of food shortage due to incessant droughts. According to the interviewees, food shortage were as a result of people's preference to grow maize which is not suitable for the low rainfall and sandy soils found in most parts of Gutu district. Bates, et.al, (2009) also hinted that the problem of low rainfall is common in regions 4 and 5 in which Gutu district falls.

Spats of droughts are ravaging Gutu district, of which elders explained that this is linked to the failure to practice traditional rituals of *mukwerere* (rain-making

ceremony).

The elders claimed that, where the ceremonies are conducted, they are characterized by a lot of defilements such as the involvement of women of child bearing age and children as opposed to elderly women. The two groups are regarded as clean; hence they are involved in the brewing of beer for *mukwerere*. The procedures of mukwerere has been clarified further by Gonese (1999), who explained that there are spiritual links to African ritual practices and this is why guiding procedures have to be followed in conducting rain-making ceremonies. Others, like Svatwa, et.al, (2007), explained that while the mitigating factors of drought are associated with traditional beliefs, this might be misleading, especially when compared to modern weather forecasting methods. Modern weather and climate forecasting methods, while they point to climate changes, the frequent droughts that are experienced the world over cannot escape the human-to-human conflicts and the human biophysical environment conflicts. Therefore, while the causes of droughts are linked to climate change; the elderly members were of the view that such calamities could be explained as punishment from the creator for transgressions by people in the community. However, these are mere beliefs of which they believed that when they asked for forgiveness and go on to conduct rain-making ceremonies, rains would fall. This cannot be substantiated hence it remains part of the traditional beliefs which cannot be taken as a fact.

6.4.1 Cultivation of small grain crops

The issue pertaining to the types of crops suitable for Gutu district pointed towards the choice of small grain crops such as finger-millet, pearl-millet and sorghum. The

sentiments mostly came from interviews with elders whose thrust of argument was that the small grain crops ensured successful harvests, even when the rains are low.

The same sentiments were shared by the professionals, agriculture and extension officers. They expressed that considering the below average rainfall received in most parts of Gutu district, small grain crops have always proved to be successful and helped in averting starvation as people who cultivate the crops, get good harvests each farming season. The assertion was proved as correct under a successful project undertaken by one resident in 2005. The project was known as the Chinyika Communities

Development Project (CCDP). The success story is detailed by Muchineripi, (2008). The project concentrated on the cultivation of finger-millet. Muchineripi's success story, hinted that, while the younger farmers preferred to cultivate established cash crops such as maize, sunflower and paprika, the growing of finger millet had helped in sustaining five thousand families within the dry and impoverished Gutu north communities, between 2005 and 2007.

The above success story of cultivating small grain crops is supported by a study done in the Munyaradzi communal area, in Gutu district by Chazovachii, et.al, (2012). The study established that the local people had succumbed to severe recurrent drought in Munyaradzi communal areas. In order to overcome the persistent food shortages, the research identified sorghum and pearl millet as suitable small grain crops which can adapt to the low rainfall climate and poor soils in Gutu district. The research went further to explain that the resistance of crops to pests and diseases and also being short

season varieties suited the Gutu climatic conditions. What this research established through in-depth interviews with community members and through focus group discussions, is that 93% of the interviewees concurred that the growing of small grain crops was the best way for farmers in dry regions to ensure food security.

The interviewees agreed that small grain crops were the most suitable crops to grow, compared to maize, but the researcher's observations through transect walks conducted, revealed that only small portions of land were devoted to the growing of the small grain crops. The bigger portions of land are devoted to the cultivation of the maize crop. The reason for this development is that communities in Gutu view the cultivation of small grain crops as labour intensive, compared to maize production. Yet another reason is the fact that people in Gutu district prefer maize as their staple food, with only a few preferring food prepared from small grain crops.

6.4.2 Management of soil fertility

Interviewees revealed that soil fertility was managed through natural ways such as the use of crop rotation, a process whereby land is left fallow for a period of five to ten years, allowing soil to regain fertility through natural ways, then crop cultivation would resume. Others talked of the use of anti-hill soil, spreading it to parts of the farming land with sandy soils so as to improve fertility. The cultivation of crops was also done at the foot of hills where tree leaves would have accumulated over the years, building fertility in the soil. It was also highlighted that people also used livestock manure to replenish soil fertility. The indigenous ways of managing soil fertility is believed to be the secret

behind the bumper harvests experienced during the past years. Unlike today, whereby people are using modern day chemicals, these require money to buy, which may not be readily available to the majority of people in the rural communities.

The other method of conserving soil fertility is called conservation farming. The farming method as explained by some interviewees resembles the traditional farming procedure of *kurima chibhakera* (digging the land using a hoe). The process of land preparation, involves the digging of some basins which are used for the planting of the seeds. The basins have 60cm perimeter and are fertilized using decayed tree leaves which are put in the basin and mixed with soil. The remains of the previous season crops are also put in the basin and covered with soil to add to the soil fertility. The farmers also apply cow dung manure which is mixed with soil before planting seeds. On planting, the seed is covered with soil in order to prepare it for germination. Conservation farming has the advantage of concentrating soil fertility on one area, the basin where the plant grows. It also allows the soil to recover fertility through natural means and also prevents soil erosion as there are little disturbances of the soil.

6.4.3 Preservation of seeds

The preservation methods applied to harvested crops and selected seeds for use during the next farming season were based on local knowledge. Through interviews, elders explained that the preservation methods they used for the small grain seeds, enabled them to keep the grains for a long period of time, even lasting into decades of years.

The other revelation was that when they selected grain seed for the next farming season, they would select the best, taken from the most fertile areas of the field. Such seeds had an advantage of giving very goods germinations. However, the germination process was owed to the preservation method used for the seeds. The use of smoke as a preservation measure ensured that the seeds remained intact and free from the harm of grain borers since soot from smoke covered the seed and it is bitter to eat, thus being secured against damage by borers.

6.4.4 Control of pests and diseases

Interviewees revealed that the problem of pests and diseases was dealt with using IK methods. The use of crop rotation was one such method to deal with aphids, for example growing maize crop on a piece of land which, in the previous farming season had groundnuts. Apart from that method, ashes are sprinkled on the field and it helps in the clearance of aphids. The use of fire, to burn stalk of the previous crops was another method used to control pests and to destroy soil borne diseases.

6.5 Animal rearing

Gutu communities keep different livestock such as cattle, goats, sheep, donkeys, pigs and chickens. The livestock kept assist with draught power; hoes are only used for the weeding. Apart from providing draught power, cattle are used in exchange for grain in times of drought. The same applies to smaller livestock such as goats, sheep and pigs; they can also be exchanged for grain or are sold to raise money which can be used to buy grain and other household necessities. Communities also take care of the health of their animals through IK methods. Interviewees revealed that *chin'ai* (soot) is used to treat multiple illnesses in animals which show signs of ill-health. The grinding of *hozwe* (snail shell) into powder is used for the treatment of watery eyes of domestic animals. The *muveghahonye* (maggot tree) is used for the treatment of animal wounds, providing quick healing. People also use *doro* (traditional beer) to treat livestock which are showing signs of constipation.

6.6 Indigenous weather forecasting

Interviews and focus group discussions provided information on indigenous weather forecasting. The interviewees explained that they read from a number of indicators to forecast the weather. For example, the elders, including 67% of some prominent rural farmers, explained that they relied on winds and bird sounds to forecast the weather, and prepare for the agricultural seasons. The same sentiments on weather forecast indicators were extensively discussed under focus groups and some detailed and

interesting behavioural indicators were revealed. For example, indicators from birds, animals, insects, creatures, celestial bodies, atmospheric appearances and the vegetation (see tables: 5.4; 5.5; 5.6; 5.7 and 5.8). The focus group discussions had participants concurring with the following average percentages: birds associated with weather forecasting (88%); frequencies associated with animals (60%), insects and creatures as weather forecast indicators (86%), weather forecasting using celestial bodies and atmospheric appearances (88%) and the ranking frequency of vegetation indicators (79%). What this means is that the majority of people in Gutu district believe in indigenous means of forecasting the weather, though, as highlighted by others, they corroborate the indicators with the information which comes from the meteorological forecasts relayed through the radio, television and newspapers.

6.7 Indigenous knowledge and environmental conservation

The communities in Gutu used to observe environmental conservation rules and regulations, but then, things changed from the time of the war of liberation, (1966-1980) and even into the post-independence era. The reason for the change was due to the fact that people took the law into their own hands during the time of the war, and no longer obeyed the rules and regulations outlined by the traditional leaders. People destroyed the natural resources, both the flora and the fauna. For example, people were engaged in the indiscriminate cutting down of trees, including the sacred trees such as the *muchakata* (*parinari curatellifolia*) cultivation of *mapani* (vleis/wetlands), causing veld fires, uncontrolled-hunting of wild animals, disregard of sacred water sources

inhabited by *njuzu* (mermaid) and other destructive practices causing soil erosion and land degradation.

6.7.1 Sacred water sources

The above belief of the *njuzu* concept was a common phenomenon in a number of communities in Gutu. One of the places is under chief Mazuru, at Gomba School. The water sources at the school are believed to have been a place inhabited by *njuzu*. One interviewee explained that the place had all signs of human life under the pool of water. This was evidenced by the beating of drums, spreading of clothes for drying and sounds of domestic animals. The sacredness of the place was supposed to be maintained by avoiding fetching water with *chirongo chinematsito* (pot with sooty), or visiting the place wearing colorful clothes and making comments which disregard the place. Any disobedient behavior was met with various consequences such as being splashed with water or being pulled into the pool. The victim taken into the pool would either come out after a long period which can stretch to a year, as *n'nga* (traditional healer) or the person may resurface after a while bleeding profusely from the nose, and would die. However, the place lost its sacredness when the school decided to use cement in securing the water sources, which subsequently turned dry. The lesson to the surrounding communities is that wetlands are not supposed to be disturbed, but instead should be safeguarded in their natural state, avoiding siltation of the water outlets so that the springs continue to provide fresh clean water to people.

6.7.2 Environmental taboos and sacred practices

The upholding of avoidance rules (taboos) was aimed at protecting natural resources from unwanted destruction. The phenomenon is highlighted in the popularized motto of the Environmental Management Agency (EMA) which advocates for “living in harmony with nature”. It seems like the old generations in Gutu communities are the only generations conscious of the need to protect the environment for posterity. The protection of natural resources is achieved through observing the dos and don'ts of sacred and revered places and practices in the environment.

The old generations protected the environment through the upholding of sacred beliefs and practices such as the *mukwerere* (rain-making ceremony). The ceremonies were held under the *muchakata/muhacha* tree. This meant that the trees became a protected species in communities because of being the venue for the conducting of rain-making ceremonies. There were taboos prohibiting the cutting down of fruit trees for firewood. Examples of the trees include; the *Mutsvubvu* (*Vitex mombassae*), *Mutohwe* (*Azanza garkeana*), *Mushuma* (*Diospyros lycioides*), *Mupfura* (*Marula* tree), just to mention those few. The reason for the prohibition was that if fruit trees were cut for firewood, they do not burn well, causing a lot of choking smoke. However, the true reason for the prohibition is that the trees bear fruits which are consumed by both wild animals so they should be protected from total plunder lest the animals invade homes in search for food. The reason for the use of taboos was clarified by Gelfand (1973) and Tatira (2000) who argued that taboos were used to foster desirable conduct in human beings not to indiscriminately plunder natural resources which should also feed wild animals.

6.7.3 Overpopulation and environmental degradation

Overpopulation was raised as one of the major causes of environmental deterioration in Gutu district. This is due to the fact that the population of Gutu district has been increasing over the years, and by the time this research was conducted, the population of Gutu district, stood at 213 263 in 2011, with a projected annual growth rate of 1.01% (Zimbabwe Statistics Office: 2002). What this means is that as the population continue to grow, so are the people's demands in the rural areas. The demands include firewood, poles for the fencing of homesteads, roofing poles for huts, clearing of new homesteads, areas to cultivate crops and for the securing of gardens. The additional burden to overpopulation is the strain on the environment caused by animals which have overgrazed the grass. Subsequent challenges emerged in the form of soil erosion which was caused by the bare soils, easily washed away by rainfall because of lack of protective vegetation. Since the vegetation has no room to replenish as was the case during the time of rotational farming, barrenness continued in an uncontrolled way, hence the semi-arid conditions in most areas of Gutu district.

6.8 Challenges to indigenous knowledge practices

The use of indigenous knowledge in Gutu district has experienced a number of challenges which contributed to the dilution of the practices. Through some interviews carried out, a number of explanations were given.

6.8.1 Western education and Christianity

The coming of Christian missionaries in Zimbabwe and Gutu district in particular saw a number of developments which transformed the way people conducted themselves in communities and even their perception of life values. For example, people who acquired western education developed changed perceptions such that some tended to be critical of African beliefs and customs, although it was part of life for the Gutu communities before the coming of the white settlers. Some of the paradigm shifts were due to the processes used by the new systems. For example, the process of securing converts in the early days of the missionaries, employed methods which were coercive. As Chimhundu (1992) puts it, some missionaries preached about the hell full of fire in order to win converts. So those who got converted completely changed, leaving all the indigenous practices, especially if they were regarded as pagan practices, be they relevant to agriculture or the conservation of the environment.

Due to a combination of Christianity and western education, the 'new' group of converts embraced different perceptions from those of the past; especially towards traditional practices such as *mukwerere/mutoro* (rain-making ceremony). They regarded the practices and beliefs as having no contribution to the falling of rainfall. The reason by elderly members to conduct *mukwerere* under big trees is meant to discouraged people from cutting down big trees which contributed to good rainfall through evapo-transpiration. As for Christianity, while there is nothing bad about Christianity, it is part of the Christian teachings which tends to despise all superstitious beliefs, customs and values as backward practices followed by pagans. For example, beliefs in the existence of human life under water bodies in the form of *njuzu* (mermaids) are regarded as a pagan belief of the underworld.

To understand the above dilemma, Mapara (2009), tried to give clarity by exploring the influence promoted by the post-colonial theory. Basically, the approach in the theory is that literature written by the colonizers (whites) distorted the experience and realities of the colonized (Africans). This was done in a way that inscribes the inferiority of the colonized, while promoting the superiority of the colonizer (whites). This kind of mentality manifests in the perceptions of the youths today, they think that traditional indigenous knowledge practices is a way of life for the illiterate members of the society, and is a sign of backwardness.

6.8.2 Modernity

The coming of white settlers brought with it the use of improved technologies in farming such as the ox-drawn ploughs, tractors and even planters as opposed to mainly using the hoe for crop cultivation. The new equipment assisted in reducing labor-intensive agricultural activities; although there were other developments which distorted IK practices. For example, the exposure which has been brought about by the Internet, television and the radio has changed the perception of the youths to Western ways of living as opposed to traditional beliefs which, to the educated, are shrouded in superstitious and mysterious beliefs, customs and values compared to modern Western lifestyles.

6.8.3 Urbanization

The influences of rural to urban migration were cited by 88% of the interviewees as having contributed to the dilution of indigenous knowledge practices. The argument is

that, the migration of the youths to urban areas in search for employment, resulted in them intermingling with different kinds of people, foreigners included. The interaction with different groups who included foreigners is blamed for contributing to the compromising of IK practices as the youths emulate alien practices which are different from what they may have practiced in agriculture and the management of the environment in the rural areas. The use of herbs to treat sick animals was replaced with modern veterinary remedies, while taboos have been replaced with the roles of the Environmental management Agency (EMA).

6.8.4 Disintegration of cluster communal homesteads

During the traditional period, before the colonization period, people in Gutu district used to live in cluster communal homesteads. The setup had the advantage of promoting the *dare* (men's meeting place) and *imba yekubikira* (hut used for preparing meals). The two set ups were regarded by the elderly members in the homes as ideal platforms which helped in teaching life skills to young boys and girls who had reached puberty stage. The youths were taught skills required in different areas such as agriculture and sustainable ways of utilizing the environment. Knowledgeable elders took advantage of the *dare* set up to share IK through didactic methods, using proverbs, riddles, songs, idioms and folklores. In the case of girls, old women taught the young women about the crops they were supposed to grow and the process of *kufuka nyimo* (cultivation of roundnuts), *kurudza zviyo* (winnowing grain) and *kutsvaga huni* (fetching firewood), putting emphasis on trees which should be collected

and those to avoid. Unfortunately, all the platforms have become a thing of the past. The development of individual homesteads has created self-centeredness on IK and the conservation of the environment. Indigenous knowledge which used to be shared at appropriate platforms of the *dare* is no longer the practice. The development of individual homesteads also meant more destruction of forests as people set up new homesteads and clearing new areas of farming land. The developments put to an end the practice of rotational farming and there was decline in crop production because of land over-use.

6.9 Sharing and transfer of Indigenous knowledge

The sharing and transfer of indigenous knowledge is an interesting issue, considering the tacit nature of the knowledge. The fact that the knowledge resides in an individual's mind means that appropriate conditions should be in place so as to allow the knowledge repositories to be able to transfer the information to the intended recipients. There are platforms which are suitable for the sharing of IK. The elders were of the view that the *dare* (men's meeting place) was a platform which brought together knowledgeable members in the community and these, shared knowledge freely so as to benefit the youths. Similarly, female counterparts used the *imba yokubikira* (cooking hut) to conduct teachings which assisted the girl child such as household chores. Different methods were used to share IK and these include folklores, proverbs, riddles, idioms and songs. The latter are indigenous methods used to convey teachings to the youngsters through deduced meanings or portrayals. For example a proverb which says, *Svinga repwa rinonaka asi harizadzi dura* meaning, (The green stalk of sweet cane may be sweet but it cannot be harvested and stored in a granary).

The proverb contains a teaching which is aimed at giving hints to an individual, say involved in agriculture not to concentrate on things which are short-lived than the productive ones. In the same manner the interviewees cited an idiom which says that *Hope hadzina ndima* meaning (Too much of sleep is not productive). The idiom was aimed at teaching people to be proactive in life in order to reap meaningful results. The teachings also fostered quick thinking on the part of the youngsters as they derived meanings to several of those teachings used at men's meeting place. Some of the teachings from taboos, as Tatira (2000) puts it, show that taboos had a surface meaning (a lie) and *chokwadi chaicho* (the truth). According to Gelfand (1979:156), "*much avoidance were enforced; some of the consequences were believed by everyone, but others were empty threats employed to discipline the children*". While both Gelfand and Tatira see the element of 'lying in the taboos', the teachings they portrayed were intended to foster good behaviour in the youngsters. This can be illustrated by a taboo cited by one elder which says, *ukawetera mutsime, unozorwara nechirwere chehozhwe*, translated as (If one urinates in a well, the person was going to suffer from bilharzias). In this taboo, the fear of contracting a disease is used as a deterrent against wayward behaviour by the youngsters, especially one which endangers aquatic life and drinking water.

A section of the interviewees comprising of successful rural farmers, 12 out of 75 constituting (16%) of the interviewees, explained that knowledge relating to farming activities, was shared through the holding of what is called a 'field day'. The latter is a gathering done at the fields of a successful farmer in the community in order to allow

other members of the community to learn and acquire knowledge through practical demonstrations. The 'field day' practice was derived from the *hurudza* (prosperous farmer) exhibitions, an idea which dates back to traditional times. During traditional time, the *hurudza* is the individual who always had bumper harvests each farming season. Under modern days, prosperous farmers, registered with the agricultural extension officers to enter the 'field day' exhibitions and usually these were farmers who had a proof record of success from previous farming seasons. Similarly, the traditional leaders had the *Zunde raMambo* (the chief's granary) to cater for the needy in times of food shortages. The chief as a traditional leader promoted the welfare of his/her people, and *Zunde raMambo* is one medium through which food security was built. Traditional custom requires the chief in any given locality to designate land for growing food crops as protection against food insecurity in the community. This common land is referred to as the *Zunde*. Members of the community provide their labour on a voluntary basis even though they do not all necessarily benefit directly from the harvest. Members of the community take turns to participate in the entire production process from ploughing and sowing to weeding and harvesting. The harvest is stored in granaries at the chief's homestead as food reserves. The grain reserves are distributed to the chief's subjects only in the event of food shortages (Dhemba, et.al, 2002).

The *zunde* platform brings people together from all age groups and the arrangement is used to share indigenous knowledge on food security. The teachings are conducted through songs, riddles, proverbs and idioms as people undertake the work. For example, the teachings of taboos at the *zunde* were aimed at ensuring that people do not recklessly destroy natural resources.

6.9.1 Benefits of sharing and transfer of indigenous knowledge

The benefits of sharing knowledge on agricultural practices utilized platforms such as the *humwe* (oneness). The idea of a *humwe* involved bringing people together in the community to assist an individual who had work in his fields or at his/her homestead. Agricultural work involved ploughing, weeding and harvesting of crops. Other activities included the transportation of *mupfudze* (cow dung manure) to the field or the digging of *churu* (ant-hill) and spreading it to areas with poor soils so as to improve soil fertility on farming land. Since *humwe* brought together most members of the community, it was a platform at which people shared and acquired information on different ways of improving their agricultural produce. Other benefits of sharing IK were in the form of acquiring knowledge from individuals who knew herbs used in the treatment of sick animals using *chin'ai* (soot), treatment of animal wounds using *muveghonye* (maggot tree) and using *gavakava* (aloe Vera) to treat chickens with *chitosi* (coccidiosis), just to mention those few.

The revival of an old farming method, *kurima chibakera* (conservation farming) offered other people in the community to adopt farming methods which could improve food security. The farmers who have embarked on the farming procedure talked of success stories of realizing bumper harvests, even when the rains average around 400-600 mm per annum as is the case in Gutu district.

Indigenous knowledge is also shared in terms of conserving the environment. Remedial measures should be taken, considering that the environment in most communities in Gutu district has been badly affected by severe deforestation, overgrazing, soil erosion

and scarcity of wild animals. One chief shared a success story of how he embarked on conservation measures aimed at reviving the environment in his areas. The chief fetched part of his area which covers 100 hectares and is maintaining natural vegetation in the confined area. The idea of conserving the environment has helped in the protection of big trees, grass and compactness of the soil. The idea is helping in that when the area is affected with drought as is the case during the recent years; members of the community are allowed to graze their animals in the fenced area up to the next rain season.

6.9.2 Challenges of sharing and transfer of indigenous knowledge

The sharing and transferring of IK is affected by a number of factors which are mainly due to the nature of the knowledge. Indigenous knowledge is tacit in nature, that is, it resides in people's minds and that make the knowledge an individual possession. As such, there are a number of challenges which were presented through interviewees.

6.9.3 Western influence and youths perceptions

Since IK is a possession of individuals, the elders who possess IK lamented that they might depart with their knowledge through death, since the youths are no longer interested in the knowledge. They explained that the young generations have developed a negative perception of IK since they view the knowledge as of relevance to the uneducated and the poor people in the society. The educated youths are pursuing modern lifestyles which no longer involve agricultural practices as a source of living. As such, the youths have no time to sit down with elders like was the case at the *dare*

(men's meeting place) to share knowledge on crop farming, animal rearing and environmental conservation. The manner in which the situation stands was summed up in the remarks of one elder who said that:

My child, things have changed a lot from what we used to value when we were growing up and what these young generations are valuing. To the youths, IK is knowledge for us the old generations, and for them, they cherish this borrowed knowledge from foreigners.

What can be derived from the elder's remarks is that modernity has transformed the youths' perception of African values, customs and beliefs. While this is a challenge in part of Gutu communities, it is a development which is not only confined to the district alone, but the whole of Zimbabwean communities.

6.9.4 Christianity

Communities in Gutu district have embraced Christianity as their religion. As such, people are subjected to teachings which do not subscribe to IK practices. For example the *mapositori* (apostolic sect) are disobeying the reverence associated with sacred water sources, or mountains which are revered for their indicators on weather forecasting and pointing to the pending farming season. Interviewees cited examples of the *mapositori* who conducted their baptism ceremonies at a dam associated with *njuzu* (mermaids) and the dam which used to enjoy perennial water is drying up in winter. The elders believe that the presence of the *mapositori* contributed to the disappearance of the *nzuzu* hence the dam is drying up. The same *mapositori* are also using some sacred mountains to conduct their worshipping and this has been followed by the disappearance of the weather forecasting indicators which communities used to rely on,

such as the outbreak of spontaneous fires on the Rasa Mountain and the sacred *vaGurudza* hill at Gomba School under chief Mazuru. While the drying of dams is a result of poor land use causing soil erosion, the mountains are no longer reliable weather forecasting indicators due to climatic change factors. What can be derived from the cited scenarios is that IK teachings of the past help in safeguarding natural ways in which the ecosystem was balanced. Due to the indiscriminate cutting down of trees, the natural ecosystem has been disturbed thus disrupting natural rainfall build up cycle.

6.9.5 Secrecy of indigenous knowledge

The sharing of IK is made difficult because of the tacit nature of the knowledge. The fact that IK resides in the minds of individuals makes the sharing and transfer difficult, mainly because of lack of openness. During the interviews, some informants revealed that they were not willing to share their knowledge since it was a source of livelihood to them. One elderly man revealed that he knew herbs which can be administered to goats so that they can multiply faster by bearing two kids on a yearly basis. However, the elder was not at liberty to share the information except if payment was done for the services. The secrecy associated with IK is due to the fact that individuals want to maintain some competitive advantage by securing rewards in form of payment as stated by the elder. This has been the trend even into traditional times to reward any form of help rendered if the one giving help asked for payment.

6.9.6 Preservation of indigenous knowledge

The international community, including the World Bank and other development agencies, has acknowledged the important role of IK in community development, in areas such as agriculture and environmental conservation. This makes it necessary to take appropriate steps in preserving IK which is possessed by individuals in rural communities of Gutu district. The findings of the study revealed that the preservation of IK fell into two categories, which are, IK which can be freely shared and the other one which puts emphasis on protection of the knowledge. The interviews explained that they had no problems in sharing IK which relates to farming methods such as *kurima chibhakera* (conservation farming), treatment of animals using *chin'ai* (soot) and use of *gavakava* (aloe Vera) for the treatment of coccidiosis in chickens. The elders revealed that they were willing to be recorded giving full narrations of the procedures and importance of conducting practices such as *mukwerere*. The other aspects they hinted about, and were willing to share, include the interpretation of weather forecasting indicators from the behaviours and sounds of animals, insects, creatures and birds. However, there were some interviewees who indicated that they were not at liberty to share the IK they possessed. The individuals include traditional healers, herbalist, midwives and elders. Traditional healers and herbalists argued that while their services were available to individuals who needed their help, they offered help upon agreed on the reward for the services. The idea of trying to secure competitive advantage by those who possess IK is supported by (Msuya, 2007). He argues that it is important to first promote IK as widely as is possible, then the next stage should be the protection of the knowledge so that the holders of the knowledge can enjoy patent ship benefits. The same view proposed by Msuya (2007) is

supported by (Chiwanza, et.al. 2013) when assessing the challenges of preserving IK, they cited as one of their recommendations that traditional knowledge should be protected so that it brings benefits to those who possess the knowledge.

6.9.7 Benefits of IK sharing and transfer

The sharing and transfer of IK by individuals who possess the knowledge has a number of benefits. These were derived from the sentiments shared by interviewees and they include the following:

- Revival of agriculture, especially through the use of *kurima chibhakera* (conservation farming);
- Promote copyright and patent issues for individuals with unique knowledge of herbs possessed by individuals such as herbalists, traditional healers and midwives, including others whose knowledge can benefit society at large;
- Preservation of IK for posterity, especially the future generations who may be interested in the knowledge to address challenges of their time;
- Distribution of benefits accrued from IK. Where copyright and patent factors apply, the benefits may be perpetual; and
- Government appreciation of IK. This will help in policy making which may help in promoting recognition and support of IK management (Msuya, 2007:348).

6.10 Documentation of IK for posterity

Since IK is a preserve of a few individuals in the society, the documentation of the knowledge helps in planning for the future because the information will be available for reference. As the expression goes, when an old person dies, it is like the whole library has been lost. The documentation of IK can be done through recordings using modern electronic gadgets, including audio and video formats, so that the communities at large can benefit well after the people who possess the knowledge are gone. The documentation can be done in the local languages, since it will promote easier understanding by the local groups, not only in Gutu, which is mostly populated by the *Karanga* people (ethnic group in the southern Masvingo province in Zimbabwe), but also other communities elsewhere in the country who may be interested in the knowledge. Documentation may assist communities to have resources and information which may help in the setting up of communal information resource centres.

From the interviews conducted throughout communities in Gutu, interviewees suggested a number of strategies to retain IK knowledge peculiar to their areas. A total 67% of interviewees suggested that the recording of unique knowledge possessed by individuals in the communities is useful preserve for posterity. For example, the idea of setting up of indigenous knowledge resource centres had 73% backing from the interviewees. The interviewees argued that the IK resource centres might attract visitors who will learn at communal level rather than visit individuals some of whom may require rewards. The issue of rewards was confirmed by 33% of the interviewees comprising of midwives, traditional healers and herbalists who proposed that their knowledge should

be codified so that they enjoy benefits. The idea of IK benefits was proposed by Msuya (2007) when he suggested that after promoting IK, the next step is to have the knowledge protected. Apart from that, (Mukuka, 2010) discussed the issue of property rights as a strategy used by the San groups in South Africa and Botswana to retain some competitive advantage over the hoodia plant whose ingredients are used as hunger suppressant agent and the treatment of a number of ailments such as diabetes, high blood pressure and stomach ache.

6.10.1 IK and education

Indigenous knowledge which is tacit in nature has to be retained through documentation which will make the knowledge available through recordings and publications. The information can be incorporated in the IK curriculum in institutions of higher learning. Interviewees in most areas of Gutu district suggested the documentation of the conservation farming practices since it can have great agricultural benefits to Gutu district's food security. The elders supported the idea of having IK being introduced in the teaching curriculum. The benefits can be useful when it is introduced at tertiary level so that the knowledge is blended with other disciplines for broader societal benefits.

6.10.2 Intellectual Property Rights and IK

The protection of IK can never be overestimated. This is because the knowledge is unique, important, and not easily available since it is tacit in nature. More so, IK has been a victim of exploitation, starting from local, national and even international levels,

involving organizations and prominent people such as chiefs, politicians and multinational companies (Ngulube 2002:64). In Gutu district, the majority of the interviewees did not talk about the protection of IK, except by individuals such as midwives, traditional healers and herbalists. The latter groups want the protection of the knowledge for two reasons. The first one is because some claim that the knowledge they have is spiritually linked to their ancestors as they at times get the information through dreams, thus to them, the knowledge is a family preserve which should be protected. Secondly, the knowledge possessed by traditional practitioners is regarded as unique services, and as such, wields some competitive advantages which should be rewarded accordingly. As for the rest of the interviewees, who did not mention about the protection of the knowledge they possess, it is possible that they acquired the knowledge through oral transfer processes, for example at the *dare* (men's meeting place) through discussions, thus it is the recipients' turn to convey the knowledge to the future generations. This approach can best be understood in the Knowledge conversion theory, explained under Nonaka's SECI model (Socialization, externalization, combination and internalization). The explanation is that since IK is tacit in nature it should be conveyed to beneficiaries through social platforms, and when acquired, the knowledge can be converted into explicit formats, that are documented. The knowledge can also be widely made available through the use of information and communication technologies (ICTs), oral recordings which can be further processed through transcription. When information is documented, individuals can be able to internalize the knowledge they feel is relevant to their needs. In the elders' views, IK should be freely

made available to benefit the youths as they are the appropriate inheritors of the knowledge. However, in cases where IK has been organized into tangible evidence, such as the recording of music, painting, processes, drawings and designs as well as stories, copyright matters should be enforced to protect the intellectual property rights of indigenous people (Ngulube, 2002:65).

6.10.3 The responsibility of upholding IK

As the expression goes, “knowledge is power”, the management and promotion of indigenous knowledge should be everyone’s concern. From the interviews carried out in Gutu communities, there were a number of proposals and suggestions on how IK could be maintained, and who should be playing what role. The following were the findings from the interviewees: 60 out of 75 participants (80%) suggested that traditional leaders as leaders and custodians of culture and traditional values should take the lead in promoting the upholding of IK practices in the communities. As the adage goes, “charity begins at home”, 40 of the 75 interviewees, (53%) were of the opinion that parents and guardians should be active in teaching IK practices to children, especially in areas where parents are knowledgeable. The other 30 out of 75 participants (40%) were of the view that the government should come in and assist in the setting up of Communal Information Resource Centres (CIRCs) in communities so that residents of all age groups can benefit freely from the knowledgeable elders.

6.11 Summary

The focus is to come up with an abridged version of the major aspects covered in each chapter.

6.11.1 Summary of chapters

The research aimed at establishing the role of indigenous knowledge in agriculture activities and the conservation of the environment. **Chapter one, presented the background to the study.** Major issues in the background include the nature of Gutu district, particularly the semi-arid climatic conditions due to below average annual rainfall, the subsistence nature of agriculture and general food shortages due to incessant droughts, types of crops grown, poor harvests and the challenges of food insecurity and the depleted environmental conditions. The listed factors were raised with the intention of establishing the role IK can play in improving agriculture production and the measures that can be taken to address environmental degradation.

Chapter two focused on the theories applicable to the management of indigenous knowledge. The theory which applies is the Organizational knowledge Conversion, popularized as the SECI model and its associated *ba* categories.

Chapter three of the study covered literature review. This focuses on published literature relating to the types of indigenous knowledge relating to farming activities and agriculture, the conservation of the environment, the acquisition, sharing and transfer of

indigenous knowledge in rural communities such as Gutu district. There are scholars who wrote about measures which could be taken to address food shortages in Gutu district and other areas in Zimbabwe, regionally and internationally. The literature available discussed about some suitable crops for semi-arid conditions, timing which focuses on when to begin crop cultivation during the farming time. Literature on the conservation of natural resources was reviewed and also the causes of environmental degradation and measures which can be taken to improve the situation.

Chapter four discussed the research methodology used in surveying the district for appropriate data, its analysis and interpretation. The survey methodology relied on purposive sampling involving 75 interviewees out of the targeted 100. A total of 8 out of the targeted 12 focus group discussions were conducted and had a total of 48 participants, 6 per each group. The chapter discussed about the data collection tools, such as the interviews, focus groups, observations and transects walks.

Chapter five presented data with the guidance of research questions and objectives. The data was presented according to themes, and premised on the qualitative research methodology, presented mainly in tables with just a few charts and graphs. Qualitative data from interviews, focus groups, observations and transect walks were presented in narrative forms, blended with extracts of verbatim narrations.

Chapter six discussed the findings of the study based on the themes derived from research questions and objectives. It also contained chapter summaries, conclusions of the study drawn from the findings and also made recommendations. The chapter summarized a number of issues derived from interviews, focus groups,

observations and opinions gathered during transect walks in the areas under study. The discussion of the data was done in relation to other studies, theories and views from literature. The themes discussed include: types of indigenous knowledge peculiar to agriculture and conserving of the environment, the methods of sharing and transfer of IK in Gutu district, benefits of IK, preservation of IK and the challenges encountered.

6.11.2 Summary of findings

The section provides a summary of the findings, based on the research objectives and the research questions. An analysis and interpretation of the data collected came up with the following deductions:

Which types of indigenous knowledge are common in agriculture and environmental conservation in Gutu district?

The study found out that there are different types of indigenous knowledge practices in agriculture and the conservation of the environment. In agriculture the most common ones were the practicing of conservation farming and growing of small grains. It was established that residents have revived the traditional conservation farming, a farming method which is helping residents to realize good harvests when compared to residents who use the conventional ox-drawn ploughing method. Conservation farming is similar to the traditional farming method of *kurima chibhakera* (digging using the hoe). The method has advantages of effectively utilizing manure and retains moisture for a reasonably long period. The cultivation of small grain crops (finger millet, pearl millet and sorghum) was cited to be helping in promoting food security in Gutu district,

Muchineripi, (2008); Chazovachii, et.al. (2012). The success stories of conservation agriculture and small grain crops have re-affirmed the role that IK can play in addressing food security in drought ravaged areas of Gutu district. Concerning livestock rearing, residents have drastically reduced the number of animals they keep just because the area reserved for grazing has been immensely reduced due to the establishment of new homesteads.

On the other hand, environmental conservation suffered due to the problem of overpopulation. The community leaders are coming up with rules and regulations which emphasize on the need to be conserving the environment by avoiding the cutting down of trees. In the past, resources were used sparingly, like the use of dry tree branches for fire wood, use of taboos to guard against the spoiling and plundering of natural resources such as water sources and wild animals respectively. From the interviewees' sentiments, the researcher found out that traditional leaders alone cannot succeed in enforcing the conservation of environmental resources. Instead, it should be a combined effort, which involves the government and residents who should ensure that there is harmony with nature. First, the government should fully restore the administrative roles of traditional leaders to the pre-colonial period in Zimbabwe. Traditional leaders have lost power to modern day judiciary systems, hence their authority, rules and regulations are undermined by residents who can challenge their authority through modern day courts, and hence the respect for traditional leaders has been lost. As such, traditional leaders have lost authority to safeguarding the traditional beliefs, customs and values in the communities' they preside over.

What are the challenges faced by Gutu communities in utilizing IK for agriculture and environmental conservation?

It was established that the continued utilization of IK by Gutu communities was being derailed by new perceptual developments brought about by factors such as modernization, Christianity and Western education. The fact that IK is dynamic and area specific means that there are changes which take place in the IK practices such that some of the practices fall by the way side while others still relevant to the communities continue to exist. In agriculture for example, Gutu residents indicated that they could not continue growing small grain crops on a large scale just because the crops are labour intensive in terms of cultivation, weeding and harvesting. The negative attitude towards the cultivation of small grain crops is due to the introduction of cash crops such as maize and sunflower, which are more preferred than the small grain crops. The preference for maize for example, is due to the fact that appetites have changed and people have grown accustomed to eating maize. Another factor influencing changes to IK developments is the advent of modern lifestyles which have brought with it new technology in the form equipment such as the plough and tractors which have replaced the traditional farming methods of digging using the hoe.

The conservation of the environment could not continue being safeguarded by the use of taboos. This is due to the fact that as residents modernized, they realized that taboos were mere avoidance beliefs which had nothing to do with the perceived consequences but were an indirect way of ensuring that natural resources were safeguarded for posterity. More so, the adoption of Christian teachings influenced the way of thinking of some of the residents who got converted. The new teachings were against the traditional beliefs in sacred practices and beliefs associated with the

existence of *njuzu* (mermaids), sacred mountains and forests. The residents expressed that some Christian sects such as the *vapositori* (Apostolic groups) began to use sacred pools for the baptism of church members, and using sacred mountains as their worshipping venues. The developments undermined the traditional beliefs associated with the areas hence they became vulnerable to destructive practices since factors which used to ensure protection were disregarded by some of the residents.

What are the constraints associated with the acquisition, sharing and transfer of IK among Gutu residents?

The findings of the study were that the acquisition of IK were hindered by modern developments which affected the continued existence of platforms such as the *dare* (men's meeting place) and the teachings which used to happen in *imba yekubikira* (the hut used for food preparations) and the roles of parents, guardians and elders as influential individuals responsible for the shaping of children's behaviour. Challenges to the sharing of IK were due to the fact that there was limited contact time between elders and the youths hinder the promotion of the mentor to mentee platforms for the transfer of unique skills or knowledge. The modern day developments are keeping children away from parents and guardians, for example children will be at school, colleges or joining employment in urban areas hence a change of focus and interests from agriculture and the management of natural resources in the rural communities. It is therefore apparent that the sharing and transfer of IK is influenced by the practices of the day, hence what residents perceive as traditional practices are falling by the way side, with modern practices prevailing.

In this study, the Knowledge Conversion theory and the Sociocultural theory applies in that the prevailing environment and the people interacted with tends to influence what people embrace through learning. In a way, the idea of adaptation is influencing the manner in which IK practices are evolving among the residents of Gutu district

What measures can be adopted to make indigenous knowledge appreciated and valued in Gutu district?

The findings of the study showed that IK can still have relevance in communities as long as it is useful to people's needs. Indigenous knowledge can be promoted through relevant educational platforms of formally embracing IK practices through knowledge sharing by the knowledgeable individuals. For example, individuals who are knowledgeable in certain practices such as conservation farming can teach other community members so that they benefit in agriculture. Apart from the influence that IK can gain through induction processes, it is also important to find a convergent point for IK promotion. This can be done through the setting up of Indigenous Knowledge Information Resource Centres (IKIRC) where contributions by knowledgeable elders and other residents is shared in such a way that the knowledge is upheld for continuity when it proves to be relevant in people's lives in the communities.

The factor of protection and recognition of IK was advocated for by interviewees falling in the group of midwives, traditional healers and herbalists. The groups proposed for the patenting of their knowledge since they argue that the knowledge is a source of livelihood for them. Through offering services, individuals assert a competitive advantage of reaping rewards when consulted.

6.12 Theories of indigenous knowledge

Indigenous knowledge as a discipline suffers from lack of theories which can help to study and understand IK facets from its own context. Therefore, what this study did was to borrow and fuse ideas from the different theories available from other disciplines. The Sociocultural theory, the Postcolonial theory and the Knowledge Conversion theory were integrated so that they complement one another in providing a theoretical framework for the study. The integrated theories were applied to this study in order to help in the analysis of interview narratives from individuals, focus group discussions and the observations of the researcher.

6.12.1 The Sociocultural Theory

The Sociocultural theory is an emerging theory that looks at the contributions that society makes to individuals as they grow. The theory stresses the importance of

interaction between people and the culture in which they live. Due to the influence of culture, it is believed that parents, caregivers, peers and culture in general are responsible for an individual's higher order functions.

While it is true that the acquisition of new ideas is a cross-pollination process which happens within a given cultural set up, the case of acquiring IK in Gutu communities is somewhat different. The foundation of IK is based on traditional practices which date back to the yester year generations. Instead of communities remaining rigid in practices which are overtaken by the passage of time and technology, there are appropriate adjustments which have taken place in communities, particularly in areas

of agriculture and environmental conservation. Farming methods have changed; the same applies to tools used in farming. However, conservation farming is being revived and incorporated in the new farming methods. The reason is that conservation farming is proving relevant to the current farming methods in Gutu district.

The area of environmental conservation has also experienced deterioration which has been motivated by changes in the communities over the years. The adoption of modern developments influenced the changes and even human. For example, Wenger (1998) explains that society plays a crucial role in shaping the behaviour of individuals. Modernity has influenced people to overlook taboos and other sacred practices. This is happening on the basis that the practices are no longer in tandem with modern day trends. The practices in (Pionke and Browdy, 2008) are a social fabric for learning, whereby members of the community learn from experiences of those they stay with. That means adjustments happen due to the dictates of the prevailing times. The

relevance of the theory is that IK practices which are relevant continue to exist while those which are losing touch with time will fall away.

6.12.2 The Postcolonial Theory

The Postcolonial theory is propounded by Edward W. Said, Gayatri Chakravorty Spivak, and Homi Bhabha among others. The theory was advanced in a way that drew some artificial division of the world in which there exist a superior race, the orient and the inferior one, the occident, representing the Europeans and non-Europeans respectively. Unfortunately, other non-European societies emulated the

theory in such a way that they abandoned their own cultural beliefs and practices. The influence remained in place even into the post-colonial period thus creating dilemmas of national identity. However, the theory cannot be solely responsible for the changes which have taken place in African communities in general and Gutu communities in particular. What should be realized is that culture is dynamic and therefore where change is influenced with the passage of time, changes take place, but what is relevant to communities will forever be perpetuated.

The theory can only be relevant in terms of influencing perceptions whereby the youths, due to exposure to other cultures, may easily emulate those cultures while developing negative perceptions towards the indigenous cultural practices. The measures which can be taken by communities to promote the continuity of IK practices can be through the introduction of a curriculum on IK being taught in institutions of higher learning so that when the discipline is taught across faculties, it helps to foster home grown

solutions to development projects. The other measure which can help to bridge the perception problem in youth is to set up some Indigenous Knowledge Information Resource Centres (IKIRCs) in parts of the communities and spread the idea to national level. In Zimbabwe, there are centres which are already in existence such as the Murehwa Culture Centre and the Bulawayo Culture Centre. The Centre display indigenous lifestyles and practices in such a way that it teaches children who visit on the valuable aspects of Africans' traditional lifestyles.

6.12.3 The Knowledge Conversion Theory

The theory is premised on (Nonaka and Takeuchi, 1985) who explained that that knowledge can be converted from one state to another so that it is retained in the organization through processes molded along what (Nonaka and Takeuchi, 1995) called the SECI model of socialization, externalization, combination and internalization. In this study, socialization entails the sharing of knowledge through participation at communal events such as participating in work at the chief's granary (*Zunde raMambo*), confiding of information and knowledge to chosen recipients as suggested by midwives, traditional healers and herbalist, communal gatherings at successful farmers' practical demonstrations so that residents learn through observations and explanations given by the successful farmers.

Socialization is another method in which IK is shared and transferred through listening, observation, imitation or practice. Interviewees in Gutu communities came up with suggestions such as the revival of forums such as *dare* (men's meeting place) and the *imba yekubira* (hut used for food preparation). The platforms were appropriate for the

teaching of indigenous practices to the youths. The elders took the opportunity of such platforms to share knowledge through the use of various teaching mechanisms such as the use of proverbs, riddles, storytelling, idioms, songs and taboos.

Externalization: Involves a process in which tacit knowledge is converted into explicit forms such as metaphors and analogies (Nonaka and Takeuchi, 1995). These could be in the form of recording narrations of IK relevant to agriculture and the

conservation of natural resources. The recording can then be transcribed and documented so that the records can be made available for posterity.

Combination is another procedure of managing IK through the use of information and communication technologies and databases (Nonaka and Takeuchi, 1995; Lwoga, Ngulube and Stilwell, (2010). In this study, it was noted that residents can exchange information through the use of cell phones. For example individuals can contact fellow residents who are knowledgeable on IK in agriculture such as *kurima chibhakera* (conservation farming) and the use of *chin'ai* (soot) and *muvingahonye* (maggot tree) in the treatment of ill and wounded animals respectively.

Internalization resembles the learning by doing concept (Nonaka and Takeuchi, 1995). The argument is that explicit knowledge is useful when it is verbalized or converted into diagrams, documents, manuals and oral stories (Ichijo, Nonaka and Takeuchi, 2007:285). The process of documentation help individuals to internalize what they experience, it is a process of enriching tacit knowledge. In Gutu district for example, interviewees suggested that the setting up of Indigenous Knowledge Information

Resource Centres (IKIRCs) will help propping up those who are knowledgeable, at the same time affording others to learn from what is exhibited and written about.

6.13 Conclusions

The conclusions focus on each of the research questions with the aim of addressing the objectives of the study. The following were the conclusions drawn:

1. The first research question is on the types of IK practices prevalent in Gutu communities in agriculture and the conservation of the environment. The findings were that there has been an abandonment of indigenous traditional practices in agriculture and the conservation of the environment. Residents are no longer practicing the rotational farming method of leaving the land fallow for a few years, such as five to ten years in order to allow soil to regain fertility through natural ways. The majority of the residents have abandoned the growing of small grain crops such as finger millet, pearl millet and sorghum in preference for cash crops such as maize and sunflowers, just to mention those two. The cultivation methods have also changed from the *kurima chibhakera* concept (digging using the hoe) to the use of oxen-drawn ploughs and the use of tractors. However, it was noticed that a few of the residents are reverting back to the *kurima chibhakera* practice which is referred to as (conservation farming). The idea of the *humwe* (communal work) in ploughing of fields, weeding and harvesting has declined with individuals preferring to hire labour which they paid for, either in cash or kind. Even the Zunde *ram mambwa* (chief's granary) has been abandoned in communities. This is because the government is now responsible for the provision of relief food to residents who experience food shortages. In terms of preserving harvested crops, the use of *matura* (granaries) still exists, though the crop preservation mechanisms is now combining the use of *ndove* (cow dung) which is smeared on the walls of the granaries and the use of modern day pesticides to kill insects and grain-borers.

The findings in the area of environmental conservation are that residents are no longer adhering to the teachings of the yester year communities in terms of

conserving the environment. For example, the idea of using dry tree branches for firewood has been abandoned and residents are cutting live trees which are dried for firewood. This is caused by the ever-increasing population which is straining resources in the communities. The use of *zviera* (taboos) in terms of conserving natural resources has been abandoned. Residents are no longer sparing trees which were prohibited from being cut down for firewood. More so, residents are no longer respecting sacred areas, be they mountains or water sources which were associated with the existence of *njuzu* (mermaid). The abandonment of the indigenous traditional beliefs is due to the development of modernity and the following of Christian teachings which have contributed to the changing perceptions and beliefs among the residents. Traditional indigenous knowledge is regarded by the youths as backward knowledge which has lost touch with current trends of life. At the same time, residents who have converted to Christianity regard some of the traditional indigenous beliefs and customs as pagan or heathen practices, for example the conducting of *mukwerere* (rain-making ceremony).

2. The second research question is on the challenges which are affecting the use of IK in promoting sustainable agriculture and environmental conservation. The findings are that due to increasing population in the communities of Gutu district, traditional practices in agriculture such as the use of fertile areas around ant-hills or at the mountain foot as well as rotating pieces of land have been abandoned as residents are confined to specific pieces of land which they cultivate repeatedly. The other challenge is that of residents abandoning the cultivation of

the traditional small grain crops such as finger millet, pearl millet and sorghum in preference of maize. This preference of the maize crop has contributed to the shortage of food among residents since the maize crop suffer due to inadequate rainfall in Gutu district. The rainfall in natural regions 4 and 5 which covers the greater part of Gutu district is between 400-600mm per annum and is not enough to sustain good maize crop harvest.

The area of environmental conservation has been equally affected by population increase which has strained the limited resources in terms of firewood, grazing area and water supplies.

The situation was worsened by modernity which contributed to the development of new perceptions, with the youths no longer believing in taboos which assisted in the conservation of natural resources. More so, the coming of Christianity and the teachings associated with Christian principles changed people's perceptions on sacred beliefs and practices and residents no longer uphold the sacredness of forests, water sources and the utilization of natural resources such as wild fruits and the vegetation.

3. The third research question is on the constraints which are affecting the sharing, preservation and transferring of IK by residents in Gutu .communities. The findings of the study were that there are a number of developments which have contributed to changes in the lifestyles in communities. Residents revealed that the abandonment of forums such as *dare* (men's meeting place) and discussions which used to be conducted in the *imba yokubikira* (hut used for the preparation of food),

disrupted platforms which assisted in the sharing of IK by elders and other knowledgeable elders in the community. The other contributory factor which disrupted the sharing of IK is the rural to urban migration. The majority of the youths and middle aged residents of Gutu district are spending most of their time in urban areas where they work. The only time they visit their rural homes is during the festive period. There will not be adequate time to interact with the knowledgeable elders and other community members to share IK and other community practices relevant in agriculture and the conservation of the environment. This has been compounded by the youths also developing a negative perception of the indigenous practices which they regard as backward. The preservation of IK is threatened with complete loss because the knowledge is now a preserve of a few individuals in the communities such as elders and other knowledgeable residents. Interviewees suggested that the knowledge can be recorded, transcribed and documented so that the young generations can read and learn about the practices for possible continuity. Others also suggested the need to set up what can be referred to as Indigenous Knowledge Information Resources Centres (IKIRCs). The centres can be visited by community members of different age groups so that they can learn from the exhibitions and demonstrations of IK practices by those who possess the knowledge. The processes of documenting and exhibiting IK practices can be the appropriate platform to promote the transferring of IK to other residents who may be interested in knowing, learning and retaining the knowledge for posterity.

It was also suggested that IK be introduced in the teaching curriculum. The teaching of IK is part and parcel of the primary and secondary education in Zimbabwe. The teaching of IK can be useful when it is introduced in institutions of higher learning such as tertiary colleges and universities. The move will help to fuse scientific knowledge conducted in laboratories and IK practices used in communities so as to improve on home-grown methods in agriculture and even the management of the environment.

4. The fourth research question is about the measures which can be adopted by the communities of Gutu district to ensure that IK is appreciated and valued in agriculture practices and the conservation of the environment. The findings were that residents should cultivate small grain crops (finger millet, pearl millet and sorghum) as opposed to the maize crop. It was realized that residents have developed an irresistible appetite for maize as a staple food, but the challenge is that the prevailing climatic conditions of perennial low rainfall cannot promote good maize yields. Instead, small grain crops have provided good yields that can cushion the communities from food insecurity. This was established by the researches done in Gutu district by Muchineripi (2008), Chazovachii et.al, (2012). Another finding was the need by Government to come up with protection laws which can safeguard unique knowledge possessed by traditional healers, herbalists and midwives. They proposed for the enactment of the Intellectual Property Rights. The laws can be crafted in the same way the san groups in South Africa and Botswana are benefiting from the hoodia patent under which they enjoy monetary benefits from the sold products. Overall, the study established that Gutu

communities are no longer following indigenous knowledge practices in the conducting of agriculture activities and the conservation of the environment. While it was noticed that there is the revival of conservation farming in agriculture, the majority of the residents prefer modern methods of cultivation, which is the oxen-drawn ploughing and the use of tractors. The conservation of the environment is a serious challenge due to the ever-increasing population who are straining the limited resources. The limited land is further strained by over- grazing, thus generally the land is barren.

6.14Recommendations

The study sought to establish the role of indigenous knowledge in agriculture and environmental conservation in Gutu district. To achieve this, the researcher was guided by the following research objectives:

- (i) To identify the types of indigenous knowledge practices which are associated with agriculture and the conservation of the environment;
- (ii) To identify the challenges which are experienced by Gutu communities from utilizing indigenous knowledge in order to boost sustainable agriculture and to ensure that the

environment is conserved.

(iii) To establish the constraints this affected the sharing and preservation of indigenous knowledge in Gutu communities;

(iv) To identify the appropriate measures which can be adopted in order to ensure that indigenous knowledge in Gutu district is appreciated and valued in agriculture practices and environmental conservation; and

(v) To suggest areas for future research.

With reference to the research findings and conclusions, the researcher makes the following recommendations:

1. Gutu district communities should revert back to the cultivation of the small grain crops such as finger millet, pearl millet and sorghum since those are the crops which suitable for the climatic conditions of the region and the nature of the soils. Researchers conducted by other researchers show that small grain crops can provide solutions to food insecurity among the residents of Gutu district (Muchineripi, 2008, Chazovachii, et al., 2012). Small grain crops withstand moisture and stressed conditions and produce good harvests thus alleviating hunger and poverty. This is in comparison to the growing of cash crops such as maize which always fail due to inadequate rainfall ranging between 400-600mm per annum.

2. The study recommends the restoration of full authority of traditional leaders (chiefs and headmen) as the custodians of the cultural practices of their communities. The traditional leaders should execute their duties and responsibilities as was done during the pre-colonial period. Chiefs and headmen should allocate land to their people unlike the current trend whereby community individuals are allocating land to residents in a random manner. Residents are no longer observing customs and values expected of them in the communities. For example, residents cultivate along river banks resulting in the siltation of rivers and dams. Traditional leaders fail to exercise their authority because they are at times corrupted by the residents through bribes so that they do not act where crimes are committed. The compromised authority of the traditional leaders' has contributed to numerous problems such as the uncontrolled destruction of the environment (trees, water sources, and wildlife, including grazing areas).
3. The government should take the initiative to assist in the revival of indigenous values and practices in rural communities. In Gutu district, the government can liaise with traditional leaders, chiefs and headmen should take the initiative in sourcing for funding to help in the establishment of Indigenous Knowledge Information Resources Centres (IKIRCs) in selected areas of the communities so that the youths and other residents can learn from exhibitions and documentation of relevant lifestyles based on the past practices.

4. The study recommends that each community should set up a project which focuses on the recording of useful indigenous knowledge possessed by elders and other knowledgeable members among the residents. IK sources can be documented at the same time making due recognition of unique sources of the information or knowledge under intellectual property implications of such inventories (Chisenga, 2002, Ngulube, 2002, Mutula, 2002).
5. The study recommends the need for embracing the teaching of indigenous knowledge in primary and secondary schools in Gutu district. The strategy may assist in that IK concepts and practices which are introduced to children at an early stage are concretized and may be appreciated as a way of life for people in a given area. The foundation built through studying IK at primary and secondary education can further be pursued at tertiary level, that is colleges and universities so that it assists in the development of home-grown solutions to different facets of lives in Zimbabwe, including agriculture and the conservation of natural resources.

6.15 Areas for further study

The researcher suggests further studies in the following areas:

- (a) An in-depth study of the role of indigenous knowledge in selected wards in Gutu district in order to overcome the weaknesses of the survey method which covered wide areas and made generalized findings of the whole district. In-depth studies help to come up with specific practices in the selected wards. This is necessary on the basis that each ward may have specific livelihood patterns which may differ from other wards.

(b) There is need for a study which consult the opinions of the youths so that they can share their views on indigenous practices which are relevant to them. It is necessary to engage the youths since the practices they recommend would be easily follow without feeling coerced by the elders.

(c) A comparative study on the role of indigenous knowledge practices in Gutu district and another district with similar livelihood patterns so that there can be knowledge exchange. The sharing of knowledge helps in identifying areas of weaknesses that can be strengthened by successful practices from the other district.

(d) Carry out a study on perennial donor support in Gutu district in order to establish the effect that donor assistance might have had on the communities' practice of indigenous ways of enhancing food security. The information gained will assist in promoting policies that support empowerment of communities to take charge of their own livelihoods rather than depend on donor support.

(e) Conduct a study which finds ways in which IK practices in agriculture and the conservation of the environment can be complemented by scientific methods so as to promote sustainable livelihoods of Gutu residents. The approach of combining IK practices and scientific knowledge is aimed at getting the best results out of the community practices through a combination of tacit and explicit knowledge.

6.16 Chapter Summary

The study established that Gutu residents are aware of the various types of indigenous knowledge practices which are useful in agriculture and the conservation of the environment. It was established that Gutu district suffers from perennial food shortages hence there is need to come up with strategies which can help in the alleviation of hunger and poverty. Indigenous farming practices which have been revived include conservation and the cultivation of small grain crops such as finger millet, pearl millet and sorghum. Where the crops are grown, residents are realizing good harvests when compared to the cultivation of maize. The small grain crops survive under severe moisture stress, unlike the maize crop which requires a lot of rains. It was also established that residents have abandoned the traditional farming methods such as rotational farming mainly concentrated on fertile areas around ant-hills and the foot of hills and mountains.

The study found out that the environment has deteriorated in the form cut down trees, over-grazed land, silted rivers and dams, depleted wildlife and overpopulation in most of the communities. The environment can no longer be conserved due to the fact that residents no longer observe environmental ethics which used to be reinforced by taboos. The negative developments on the environment are attributed to developments in the communities. For example, modernity, Christianity and overpopulation affected the communities and the manner in which natural resources were managed.

On the other hand, it has been found out that Gutu residents no longer uphold the existence of platforms which helped to promote the sharing of indigenous knowledge such as the *dare* (men's meeting place) and discussions with girls in the *imba yekubikira* (hut used for food preparation). As such, youths have developed new perceptions about indigenous practices, opting for modern day lifestyles. The study recommended the teaching of indigenous knowledge in primary and secondary schools so that the knowledge can be appreciated by children at an early stage of their lives. When children learn and appreciate IK practices earlier in their lives it is a good development for posterity. The study also recommended the need to establish Indigenous Knowledge Information Resource Centres (IKIRCs) where residents of all age groups can learn from the exhibitions and documentations of the yester year life styles.

6.17 Final conclusion

The study draws a final conclusion that, while IK has a role to play in agriculture and environmental conservation in Gutu district, there are considerations which residents cannot ignore. For example, the development of modern lifestyles and the ever-increasing population had influences on agriculture. Residents abandoned the use of hoes for digging the land in preference of ploughs and tractors in farming. Residents also developed new tastes on food stuff, preferring maize as their staple food as opposed to the small grain crops such as finger millet, pearl millet and sorghum. The preference for new crops has resulted in severe food shortages due to failing harvests. The effects have been worsened by climate change which has disrupted the weather

patterns in the district. As such, residents of Gutu have become perennial recipients of donor assistance in terms of food provision. In some instances where residents are using conservation farming, the harvests are good and that may mean that the farming method could be the solution to food insecurity in Gutu district. The cultivation of small grain crops may also go a long way in alleviating food shortages as the crops provide harvest even when there is little rainfall ranging between 400-600mm per annum.

The environment has also suffered due the effects of overpopulation. Most areas in the communities which used to be surplus land have been occupied by residents, and during the process of establishing homesteads, a lot of vegetation has been destroyed. Other than that, residents rely on firewood as a source of power and this has continuously strained the limited resources under an ever-increasing population. More so, residents' perceptions have changed and they no longer observe the yester year environmental ethics which were enforcing through *zviera* (taboos) associated with the environment and the management of natural resources for posterity.

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Appendices

Appendix 1: Glossary of Terms

Important Terms and Concepts used in the study

These are terms and concepts which should be clarified since they will be frequently used in this study.

Agriculture

Agriculture is the science of cultivating land, producing crops, and raising livestock.

(<http://science.yourdictionary.com/agriculture>, September 1, 2010).

Environmental conservation

Also known as environmental protection, is a practice of protecting the environment, on individual, organizational or governmental level, for the benefit of the natural environment and (or) humans.

Explicit knowledge

It is codified knowledge that can be transmitted in formal and systematic language. It is captured in records of the past such as libraries, archives and databases and is assessed on a sequential basis. It can be expressed in words and numbers and shared in the form of data, scientific formulate, specifications and manuals. In the West, in general, this form of knowledge has been emphasized. (Michael Polanyi, 1966).

Indigenous knowledge

It is knowledge that local people in a given area or community have developed over time and which they continue to develop. (Scoones, Thompson, 1994; Warren, 1991).

Grenier further explains indigenous knowledge as being: “...the unique traditional knowledge existing within and developed around specific conditions of women and men indigenous to a particular geographic area” (Grenier 1998:1). The World Bank (1998) defines indigenous knowledge as local knowledge that is unique to every society and culture. It is the basis for local decision making in agriculture, health, natural resource management and other activities. The Southern African Research and Documentation Centre (SARDC, n.d) also defines an indigenous knowledge systems as “a body of knowledge and beliefs built by a group of people, and handed down generations through oral tradition, about the relationships between the living beings and their environment...that govern resource use”.

Knowledge management

It is the name of a concept in which an enterprise consciously and comprehensively gathers, organizes, shares, and analyzes its knowledge in terms of resources, documents, and people skills. (Takeuchi and Nonaka, 2004), explains it as the process of consciously creating new knowledge, disseminating it widely through the organization and embodying it quickly in new products, services, technology and systems.

Taboos

These are avoidance rules that the Shona people of Zimbabwe engages as a way of influencing members to conform to society’s values and norms (Chigidi, 2009).

Tacit knowledge

Is that knowledge which is understood within a knower's mind and which cannot be directly expressed by data or knowledge representations. It is commonly referred to as unstructured knowledge (Nonaka and Takeuchi, 1995) and (Polanyi, 1967).

Sustainable development

Is a process, which seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future (Brundtland 1987).

Sustainable livelihoods

Sustainable livelihoods is a term derived from people's capacity to make a living by surviving shocks and stress and improve their material condition without jeopardizing the livelihood options of other people's, either now or in the future (Krantz, 2001).

Appendix 2: Cover Letter

University of Fort Hare

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

Dear participant

My name is Obert Wutete a PhD student in the Department of Library and Information Science, University of Fort Hare, South Africa. I am conducting a study in partial fulfilment of the requirements of a PhD degree in Library and Information Science. My study is titled: **“The role of indigenous knowledge in agriculture and environmental conservation: The case study of Gutu District, Zimbabwe.”** Indigenous knowledge is tacit knowledge which is routed in individuals’ minds, of which when it shared, used and retained; the knowledge can make significant contributions which can transform lives within communities in the areas of agriculture and environmental conservation. From that point of view, I kindly request for your cooperation and participation in the interviews whose guide is herewith attached.

The main objective of this study is to establish the types of indigenous knowledge used in Gutu district in the areas of agriculture and environmental conservation, how the knowledge is acquired, shared, used and even retained for posterity concerns the researcher. The study also intends to come up with suggestions on the measures which communities can adopt in order to retain indigenous knowledge for posterity. The study will focus on Gutu district as a whole and if the findings are applicable to other areas with similar conditions and cultural practices, then that would be done. Similarly, benefits for your areas would also be applied accordingly.

You have been selected to participate in the study because of your familiarity and long stay in the area under study. Please note that your participation in the interviews is purely voluntary and you are assured that the information you provide will be treated confidentially and also that your privacy would be upheld. Please feel free to express your views and opinions openly. The researcher will be using a voice recorder to capture the interview, with the assistant taking down some notes. Deducing that this is agreeable, I will proceed with the interview under your verbal consent.

Appendix 3: Interview Guide with Different Members of the Community in Gutu District (Chionioni chemibvunzo yetsvakurudzo inoitwa nevagari vakasiyana siyana vemudunhu remaGutu).

SECTION A (CHIKAMU A)

Preliminary Information (Zvinoda kuzivikanwa shure kwemibvunzo)

1. Name and Surname (Zita dungamunhu nezitaremhuri).....
2. Age
(Zera).....
3. Gender (Munhukadzi kana munhurume).....
4. Place of Birth (Nzvimbo yamakazvarirwa).....
5. Social Status (Zvamakamirira munzvimbo).....
6. Marital Status (Chimiro chenyu maringe nekuroora kana kuroorwa).....
7. Religion
(Chitendero).....
8. Duration of stay in the area (Nguva yamagara munzvimbo).....
9. Name of Kraal Head (Zita raSabhuku).....
10. Name of Headman/ Sub Chief (Zita raSadunhu).....

SECTION B (CHIKAMU B)

Indigenous Knowledge Awareness_(Kushambadzwa Kweruzivo rwepasichigare)

Indigenous Knowledge is local knowledge which is unique to a given culture or society. It is also referred to as unique, traditional, local knowledge existing within and developed around specific conditions by women and men indigenous to a particular geographical area. (Ruzivo rwepasichigare ruzivo rwenharaunda runosiyanasiyana zvichienderana netsika namagariro uye nedunhu. Runoonekwa serunemutsauko, serwepasichigare, seruzivo rwenharaunda runorukwa uye zvichienderana nemamiriro ezvinhu pakati pavakadzi nevanhurume vanova vagari venzvimbo)

11. In your understanding, what constitutes indigenous knowledge?
(Mukuzivakwenyu ndezvipi zvinowanikwa mumupanda weruzivo rwapasichigare?)
12. Indigenous traditional knowledge practices have become seriously compromised, in your opinion, what could be the cause? (Ruzivo rwapasichigare harukosheswi zvachose, sokuona kwenyu, ndezvipi zvingava zvikonzero?)
13. What kinds of indigenous knowledge were peculiar to agricultural practices years back? (Nderwupi ruzivo rwepasichigare rwakange rwakanangana nemarimire enyuakare?)
14. Which traditional crops were grown in your area years back, and are no longer grown nowadays, why? (Ndedzipi mhando dzembeu dzairimwa munzvimbo menyu makare-kare, dzisingacharimwi mukoreuno, uye chikonzero chii?)
15. Explain any special kinds of agricultural knowledge/ skills possessed by the older generations and in what way do they compare with those used today? (Tsanangurai mhando dzeruzivo rwokurimarurimuvasharukwa uye runofanana kana kusiyana sei nerwazvino?)
16. Why are most parts of Gutu district experiencing spats of droughts in recent years? (Nemhakayei matunhu mazhinji maGutu avakusangana nenzara makore ano?)

17. What happened to the forests of yester year to the extent of turning the area look so barren, (semi-arid?) (Chii chakaita kuti masango akare angeasisina zvimera, (Kungegwenga?))
18. Are there taboos or sacred places within your surroundings, and are they still respected? If your answer is no, explain the effects. (Kunemhiko here kana nzvimbo dzinoera munzvimbo dzakakukomberedzai, uye dzichirikuremekedzwa here? Kana mhinduronyenyu iri kwete, tsanangurai zvinetswa zvinosanganikwa nazvo)
19. Looking at the state of decline in agricultural production and environmental deterioration, what do you think should be done to revive the vegetation? (Takatarisa kudzikira kwaita mhando dzegoho rekurima nekukanganisika kwenharaunda, munofunga kuti chii chingaitwe kuti masango amutsidzirwe?)

SECTION C (CHIKAMU C)

Indigenous Traditional Knowledge Sharing (Kukwapurirana ruzivo rwapasichigare)

Since Indigenous Traditional Knowledge (ITK) is tacit in nature, (resides in people's minds), it is passed through the word of mouth to its intended recipients, and the trend goes on from one generation to the other. (Sezvo ruzivo rwepasichigare ruchigara mundangariro dzavanhu, runokwapuriranwa, nomuromo, uye maitiro acho ndeekubva kunerimwe zera zvichienda kune rimwe.)

20. The old generations possessed immense indigenous traditional knowledge, why do you think current generations are lacking appreciation of this knowledge? (Mazera makuru akare aneruzivo rwepasichigare rwakakosha, sei mazera anhasi asingakoshesi ruzivo uru?)
21. In your view, how can the younger generations gain from the indigenous knowledge of yester year? (Samafungiro enyu, vechidiki vangabatsirika sei kubva muruzivo rwapasichigare?)
22. What problems are associated with the sharing of indigenous knowledge, especially by those who possess the knowledge and the intended recipients? (Ndeapi matambudziko arikusanganwa nawo pakupakurirana ruzivo rwapasichigare, pakati pavanoruzivo rwacho nevanofanira kurukwapa?)

23. How does the lack of sharing of indigenous knowledge contributed to problems affecting the viability of agriculture, as well as the deterioration of environmental conservation? (Ndezvipi zvikonzero zvauyiswa nekusagoverana ruzivo rwapasichigare mubudiro yezvekurima pamwe chete nekutsakatika kwenharaunda?)
24. Is there any age restriction in the sharing of indigenous knowledge? Explain your answer. (Pane mazera here anotarisiwa panokwapwa ruzivo rwapasichigare? Tsanangurai mhinduro yenyu.)

SECTION D (CHIKAMU D)

Indigenous Knowledge Transfer (Kukwapurirana ruzivo rwapasichigare)

Knowledge Transfer is the process of imparting knowledge to recipients through verbal means or practical demonstrations in a systematic way. (Kukwapurirana ruzivo rwapasichigare inzira dzokupa ruzivo kune vamwe kupfurikidza nokutaurirana nokuedzesera kuzviita nenzirakwadzo.)

25. What mechanisms can community leaders and the elderly members employ to facilitate effective transfer of indigenous knowledge to the younger generations? (Ndedzipi nzira dzakakodzera dzokuti vatungamiri pamwe nevasharukwa vangashandisa kudzidzisa vechidiki ruzivo rwapasichigare?)
26. What benefits, in terms of agricultural production and environmental conservation can be derived from indigenous knowledge to help revive better livelihoods among community members? (Ndedzipi batsiro dzokuti tinogona kutaura nezvadzo takanangana nokurima nokuchengetedzwa kwamatunhu dzinoratidza kutiruzivo rwapasichigare runogona kushandura upenyu hwevavanhu mumatunhu amugere?)

SECTION E (CHIKAMU E)

Indigenous Knowledge Documentation and Protection. (Kunyorwa pasi kweruzivo rwapasichigare nokuruchengetedza)

Knowledge documentation and protection is a means of ensuring that valuable knowledge is retained for posterity and at the same time ensuring its protection against free exploitation. (Kunyorwa pasi kweruzivo rwapasichigare nokuruchengetedza inzira yokuti zivo yakakosha ichengetedzwe kuzoshandiswa mune ramangwana uyevo kuva nevimbo yokuichengetedza kuti isatapiwe mahara nevekunze.)

27. While IK is usually orally transmitted by the informants, could there be any problem with documenting the knowledge for the benefit of future generations? (Sezvo ruzivo rwapasichigare ruchigoverwana kupfurikidza namashoko kubva kune vane zivo yacho, hapagoni here kuva nedambudziko pakunyorwa kwezivo iyoyi pasi kuti izobatsira vacharama mune ramangwana?)
28. What are your views with regards to the documentation of indigenous knowledge for reference by future generations? (Munozviona sei kuti kutorwe matanho okunyorwa ruzivo rwepasichigare kuitira kuti rubatsire vadiki vamangwana?)
29. What other measures can be taken to ensure that our indigenous traditional knowledge (ITK) is retained and utilized in order to revive the benefits of yester year? (Ndeapi mamwe matanho angatorwa anopa vimbo yokuti ruzivo rwapasichigare ruchengetedzwe nokushandiswa kumutsiridza batsiro dzakare?)
30. Which sections of the communities should be tasked with the responsibilities of safeguarding indigenous knowledge? Explain. (Ndeapi mapoka anofanira kuona nezvechengetedzo yeruzivo rwakare? Ipa tsanangudzo).

Appendix 4: Interview guide for Focus Group Discussions

Section A: Background Information

1. Gender

Male

Female

2. Age:

20 -29

30- 39

40-50

51-60

61-70

71-80

Above 80

3. How long have you lived in this area?

Since 2000 – to date

Since 1980s- 1990s

Since 1960s- 1970s

Since 1940s – 1950s

Since 1920s -1930s

Section B: Indigenous knowledge and agricultural weather forecasting

4. Rural communities realized that some animals, birds, insects and plants have the capacity to detect and respond to changes in the atmospheric conditions, as well as interpreting celestial bodies like stars, the moon and prevailing winds.

Which birds are associated with weather forecasting in your area? Illustrate your answer in the table below:

Bird	Behaviour	Forecast

5. Besides birds, which animals are used to predict the weather? State the behaviour and corresponding forecast.

Name of animal	Behaviour	Forecast

6. Celestial bodies (Sun, moon and stars) as weather forecast indicators in your area?

Celestial body	Behavioural sign	Forecast

7. Which weather forecast is deduced from the indicators listed below:

Weather Outlook	Behavioural sign	Forecast

8. List the vegetation or plants that can be used as weather forecast indicators.

Vegetation identity	Appearance sign/s	Forecast

9. There are types of insects or creatures which are used to forecast the weather in your area. Provide details:

Name of insect or creature	Behaviour	Forecast

Section C: Indigenous knowledge and environmental conservation

10. What methods did yester year elders use to ensure the protection of the environment against destruction?
11. Why has there been serious deterioration of the vegetation in your area?
12. Who should be responsible for the safeguarding of the environment and why has this seemed not to be working?
13. Are there tree species which are protected in your area, and are they still part of the vegetation today? Provide details to your answer.
14. Is the sacredness associated with some forests/ areas still existing today? Provide details.

Section D: Challenges to indigenous knowledge retention, sharing and transfer

15. In your opinion, what could be the reasons making it difficult to maintain the usefulness of indigenous knowledge as was the case years back?

16. Sharing of indigenous knowledge today is no longer effective, what are the causes?
17. Why are people not comfortable with sharing and transferring indigenous knowledge to other people in their communities?

Section E: Measures for the revival of Indigenous Knowledge

18. In your view, whose role is it to help in reviving indigenous knowledge in your area?
19. Are traditional leaders still performing the roles they used to play years back?
20. Is the use of proverbs, riddles, folklores, rituals and songs still prevalent in communities today? Provide details to your answer.

Appendix D: Observation guide

A Agricultural activity (Crop production)

- (i) Land preparations.....
- (ii) Crops grown.....
- (iii) Cultivation methods.....
- (iv) Harvesting methods.....
- (v) Preservation methods.....

B Agricultural activity (Animal rearing)

- (i) Types of animals kept.....
- (ii) Domestic uses.....
- (iii) Breeding methods.....
- (iv) Treatment of diseases and wounds.....
- (v) Grazing lands.....

C Natural resources (Vegetation)

- (i) Type of trees.....
- (ii) State of vegetation.....
- (iii) Uses of the vegetation.....
- (iv) Conservation measures.....
- (v) Plantations.....

D Natural resources (Water sources)

- (i) State of rivers and dams.....
- (ii) State of water springs.....
- (iii) Water wells.....
- (iv) Availability of irrigation schemes.....
- (v) Aquifers.....

E Natural resource (Land utilization)

- (i) Farming land.....
- (ii) Grazing land
- (iii) Farrow land.....
- (iv) Forest areas.....
- (v) Area for communal gardens.....

F Other observations

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Appendix 5: Letter of introduction from the Supervisor

**Department of Library & Information Science
Faculty of Social Sciences & Humanities**

2nd Floor, Psychology Building, Alice Campus

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University of Fort Hare
Together in Excellence

15/04/2011

TO WHOM IT MAY CONCERN

Dear Sir,

RE: INTRODUCING MR. OBERT WUTETE (REGISTRATION NUMBER 201001907)

This serves to formally introduce the above named as a full time Doctor of Philosophy (PhD) student in the Department of Library and Information Science, University of Fort Hare, Alice, South Africa. Mr. Wutete has proposed to conduct research on a research project titled "*The Role of Indigenous Knowledge in Agriculture and Environmental Conservation: a case of Gutu district, Zimbabwe.*"

Mr. Wutete's research proposal has been approved by the Higher Degrees and Research Committee of the Faculty of Social Sciences and Humanities and duly registered by the University of Fort Hare as a research project. As the student's supervisor, I am very satisfied that the topic is researchable. It is being increasingly realized that indigenous knowledge has an important role to play the development process of underdeveloped regions of the world.

Mr. Wutete would like to collect data for the research project by way of interviewing those deemed to be sources of indigenous knowledge in Gutu district. As a Department, we request that you assist Mr. Wutete to distribute questionnaires and/or conduct face-to-face interviews. Any other assistance given to Mr. Wutete would be highly appreciated. Please do not mind that you do not know much about indigenous knowledge systems. For any further information about Mr. Wutete, please do not hesitate to contact the undersigned.

Thank you for your kind assistance.

Sincerely,

**Prof EM Ondari-Okemwa,
Supervisor and Head, Department of Library and Information Science.**