The Survival of Socio-cultural Beliefs and Local Knowledge about Management of Natural Resources in an Aids-affected Community in Zimbabwe

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I, Mary. M. Karadzandima, do hereby declare to the senate of the Agricultural University of Norway that this thesis is the product of my own investigation except where otherwise acknowledged.

This work has not been previously accepted for any degree and is not being currently submitted in award for any other degree.

Signed:…………………………………

Date:…………………………………
Dedication

To special people,
for a special time,
with special love:

Annie Mutsa
Rosemary Tafadzwa
Idah Kuziwa
David Simba
Julie Rudo

To my parents,
for giving me so much,
especially knowledge.

To Godfrey, for lessons
learned and shared,
for everything.

And to my grandmother;
for the sweet memories,
you are not forgotten!

M.M.K.
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Unless the Lord builds the house, those who build it labour in vain. Unless the Lord watches over the city, the watchman stays awake in vain. Psalms 127: 1

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Abstract

Local knowledge contributed to the conservation and management of natural resources through belief systems and cultural norms that were expressed in traditions and myths. The environment was well understood through a close interaction between people and the natural resources and judicious measures were taken to ensure resource sustainability. The survival of local knowledge is being threatened by various interacting factors that do not promote its utilization and transmission. This scenario was observed in a study done in Mutare Rural District, Manicaland Province in Eastern Zimbabwe, whose main objective was to assess the survival of socio-cultural beliefs and local knowledge about management of natural resources in a community that has been devastated by HIV/AIDS.

Data was collected through questionnaire interviews, household surveys and a field survey of the physical environment. The responses from the questionnaires yielded data on people’s perceptions of local knowledge and how it has been employed in conservation and management of soil, water, forest resources and wildlife. The field survey was used to identify the vegetative composition and physical attributes of Marange Communal Area, which is a part of Mutare Rural District.

The study supported earlier work that had shown that the people in this community possess a lot of local knowledge about management of natural resources and socio-cultural beliefs, but the use of this knowledge is decreasing from generation to generation. There is great knowledge possession, which is shared to a lesser extent. The impact of HIV/AIDS is affecting family structures and changing people’s roles, behavior and responsibilities. The epidemic is interacting with effects of gender differences; age; church membership and external systems in militating against the transfer and survival of local knowledge. The study highlighted the important role the community and the extended family safety network play in teaching local knowledge to orphans.

The study also showed that local knowledge about resource management continually changes in response to coevolving social, economic and ecological systems. Changes in local knowledge were observed in that, between formal and informal theories, processes of replacement, incorporation and reinterpretation were taking place. These processes are driven by overpopulation, resource depletion, new technologies, marketing and other economic factors, making it imperative to adopt changes to development and extension approaches in the community. Using the complementarity of the informal and formal knowledge networks can help achieve this goal. Adaptive management offers an opportunity to cope with these changes in a way that improves livelihoods for the present and future generations.

The local knowledge that has been gathered through numerous research projects needs to be documented, revised and reviewed so that the dynamic nature of local knowledge is captured. Extension work should be used to promote information flow. This extension service should encourage communities to promote the usage of local knowledge that improve livelihoods, food security and health.

Key words: Local Knowledge; socio-cultural beliefs; survival; change; Marange Communal Area; HIV/AIDS; Adaptive management.
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Chapter 1: Introduction

1.1 Background

People in the rural communities gain their livelihoods in a variety of ways, which are usually centred on the environment. Rural livelihood success varies amongst households depending on their access to environmental resources and understanding of the environment. Inhabitants of rural communities learn to adapt to pressures arising from social, economic and environmental changes. Present day people in rural communities experience influences from urban communities as infrastructure develops that reduce community isolation resulting in increased community interactions. The interactions between rural-rural and rural-urban communities have led to various phases of “ruralness” in these communities (Bernstein, 1992).

People in rural communities possess knowledge on diverse aspects of the environment that enhance their survival and sustainability of resources. This knowledge enables them to make decisions in the fields of agriculture, health-care, food security, education, natural resource management and other activities. The knowledge is based on oral history, ecology, geographical knowledge and administration. The people have over the years, gained an understanding of the environment through experience and this knowledge has been passed from generation to generation, thus ensuring community survival. However, within the community, there exists a high degree of heterogeneity and diversity.

Indigenous knowledge (IK) is the name given to the knowledge that is held by indigenous peoples or unique to a culture or society (Berkes, 1999a, Warren et al., 1995). It varies from one local community to the other and differs with scientific ecological knowledge (SEK) in that, it employs a holistic approach and may not be as systematic as the latter. This has led to indigenous knowledge to be looked down upon, but of late this has been changing. However at a time when SEK and other sciences were beginning to pay attention to IK, the base of the latter has been thinning. IK is being lost at unprecedented rate, and its preservation, preferably in data base form, should take place as quickly as possible (Warren, 1992a). The loss has been attributed to various factors affecting the transfer mechanisms that used to be in place long ago.
One major threat especially in developing countries has been AIDS, which threatens various kinds of systems and sectors including agriculture, economies, livelihoods etc. As AIDS affects the productive age groups, this has resulted in the knowledgeable generation being lost. The numbers of orphans are increasing in affected countries. The fates of these orphans depend on the household structures in which they find themselves, culture and the extended family relationships. Thus older siblings, grandparents, other relatives and caregivers look after orphans. The grandparents who are usually old and sick and burdened with many economic problems find themselves looking after the orphans.

In the past, grandparents or the elder generation had the role of passing IK to younger generations, but today, it appears as if this mode of knowledge transfer is no longer as effective as it used to be. This might have been caused by the economic burden on the elderly people or the fact that children growing up in this day and age are not interested in learning about the traditional ways of life. An attempt to answer questions of survival of local knowledge will be the core purpose of this thesis. The focus of the study will be on the role and importance of elders as a resource-base for IK and factors that may affect transfer and survival of such knowledge. The research work was aimed at exploring ways of promoting IK transfer mechanisms designed to pass knowledge from generation to generation.

1.2 Statement of the Problem

The problem was formulated after it was noted that there might be an erosion of IK occurring in Zimbabwe and many other parts of the world. This was attributed to modernization and the moving wheel of time that gives less importance to IK. But, maybe the present growing generation has lost that “special relationship” with their elders that used to exist in the past or the elders have lost the interest in passing this knowledge to youngsters? Or youngsters possess IK in parts, and not as a holistic system as was the case in the past? It was also of interest to find out if youngsters just possess the knowledge or they share (believe) it with elders. Whatever is the existing scenario was my area of research as I endeavoured to find out if IK has lost its relevance to the present generation. I discussed with young and old people to hear their perceptions of IK and I tried to suggest ways of capturing this knowledge to ensure its survival. I hope that the findings of this thesis will contribute towards the documentation of IK and make it one of the highest research priorities. The problem scenario and its possible links are presented in figure 1:
Figure 1: Possible Links in the Problem.

- Local knowledge survival being threatened?
  - Livelihood losses
  - Increased uncertainty
  - Affecte[d people and technology.
  - Ecosystem management
  - Reductionist approach
  - Livelihood loss
  - Livelihood losses
  - Loss of resilience and sustainability
  - Poor Documentation
  - Modernization
  - Value lost through time
  - Younger generation not exposed to local knowledge.
  - Exclusion from formal resource management.
  - Not recognized by western science.
  - Undermined base for sustainable resource management.
  - Changing family structures.
  - AIDS menace

Figure 1: Possible Links in the Problem.
1.3 Purpose of the Study

Manicaland Development Association (MDA), a non-governmental organization in Zimbabwe did some work in 2000 on documenting the natural resources found in Nyachityu Ward, Mutare Rural District, which was my study area. The report prepared by MDA showed that the local community had a lot of IK about the natural resources found in the area. As there was a lot of knowledge amongst the community (adults mostly), it was of interest to study if the younger generation possessed the same high level of knowledge, and try to understand the transfer mechanisms in the hope of sustaining them. Children aged between 10 and 14 years were interviewed to see their level of IK about socio-cultural beliefs that promote resource conservation and management of four main categories of natural resources, which were soil, forests, wildlife and water.

Possessing IK is important for sustainable ecosystems and livelihoods. This depends on whether knowledge is shared or it is just known. Shared knowledge implies belief and appreciation of the knowledge whilst one can have knowledge about an issue, but may not believe it. IK may be useful in a community that is battling with the AIDS epidemic, which was reported to have affected about 40% of the adult population in the province (MDA, 2000). Women who have the burden of looking after sick husbands and/or other relatives head most of the AIDS affected households. This may affect survival of local knowledge with effects of HIV/AIDS working together with other factors such as age, religious affiliation and external influences. Population densities in the villages have been increasing dramatically as sick people come from urban areas to their rural homes.

1.4 Research Objectives

The major objective was to assess the survival of local knowledge about management of natural resources through household institutional arrangements, in the face of changing family structures as a result of HIV/AIDS. The study would determine the social and ecological impacts of family structure and other factors on the transfer and survival of socio-cultural beliefs and local knowledge about management of natural resources from generation to generation and identify knowledge that is common to the younger generation. The specific research objectives were to:
1. Investigate the influence of family structure and relationship to household head in the transfer of local knowledge.

2. Investigate the influence of gender in the transfer of local knowledge.

3. Investigate the influence of age on the transfer of local knowledge.

4. Assess the influence of religious affiliation on the transfer of local knowledge.

5. Assess the effect of locality and external influences on the transfer of local knowledge.

1.5 Research Questions

The following research questions were addressed:

1. Does the existing relationship between elders and people of the younger generation accommodate traditional methods of transferring local knowledge?

2. What kinds of traditional environmental knowledge do people still possess and how is this knowledge used to survive and to live in harmony with nature?

3. Is the knowledge possessed passed from elders and how do gender, age, religious affiliation and external factors influence the transfer and survival of local knowledge?

4. Are there differences between children who grow up living with elderly people and those that are not attached to elders in their levels of local knowledge about management of natural resources and socio-cultural beliefs?
2.1 Indigenous Knowledge Systems

The literature on indigenous knowledge does not provide one unanimous definition of the concept. This is because of differences in background and perspectives of the authors, which range from social anthropology to engineering fields. Indigenous knowledge has been defined as the local knowledge that is unique to a given culture or society (Berkes, 1999; Warren et al., 1995). Indigenous knowledge through the years has tended to lose its value as scientists have taken to western science with its models to explain most aspects of natural resource management. Of late, however researchers are only beginning to appreciate its values (Oba, 1994). This has come about at the realisation that for thousand of years, people around the world have used knowledge of their local environment to sustain themselves and to maintain their cultural identity (Johnson, 1992). This is because indigenous knowledge is based on experience and forms the basis for decision-making when people are confronted by familiar and unfamiliar challenges.

Indigenous knowledge has been used in diverse areas for survival and sustainability of resources since time immemorial. Indigenous range management comprises aspects of oral history, ecology, geographical knowledge, range administration, management of natural resources, livestock husbandry, food security etc. (Oba, 1994). Despite the realisation that Indigenous knowledge has much to offer, there are still lingering doubts about fully integrating it into management practices (Matowanyika, 1999). This is probably caused by the fact that indigenous knowledge about local resource management strategies pose problems because they incorporate multiple epistemologies, possessed by different groups of people (Redclift, 1994). It is not possible, therefore to make sense of local management without understanding the context of indigenous knowledge and a mixture of epistemologies (Berkes and Folke, 1998).

Many terms have been used interchangeably to describe this knowledge, but in this thesis, the term local knowledge will be used. Local knowledge is preferred here as it points out the nature of the community, which consists of people related in spatial terms in a certain locality, and not to a single indigenous group of people. The knowledge is essentially local, in that it
exists within, and is developed around, the specific conditions of men and women in a particular geographical area (Appleton and Hill, 1994). On the other hand the term “indigenous” is often associated solely with specific ethnic, religious, or cultural groups or populations, typically those occupying ancestral lands (Appleton and Hill, 1994). The term “indigenous knowledge systems” applies to many local, but not necessarily indigenous communities. Local knowledge has also been compared to indigenous technical knowledge (ITK); ethno ecology; folk knowledge; traditional environmental (or ecological) knowledge (TEK); people’s science etc. Practitioners prefer to use traditional ecological knowledge (TEK) more specifically to refer to the cumulative body of knowledge and beliefs handed down through generations by cultural transmissions, about the relationships of living things, including humans, with one another and the environment (Berkes et al., 1995). There is arguably enough overlap between the meanings to recognise the existence of a shared intersubjective understanding, some “epistemic community” which permits a sufficient degree of common sense engagement to allow that they refer to the same focal semantic space (Redclift, 1994).

Local knowledge gives community closer relationships and practical application to plants, animals, soils and other natural components. Local knowledge has several characteristics that distinguish it from other forms of knowledge. According to Ellen and Harris (1996) and Scholl (1992), local knowledge is:

1. Rooted in a particular community and situated within broader cultural traditions.
2. Transmitted orally through imitation and demonstration and an attempt to codify it may lead to losses of some properties.
3. Experienced knowledge rather than theoretical as it is tested in the rigorous laboratory of survival of local communities which reinforces knowledge.
4. Learned through repetition and this aids in its retention and reinforcement.
5. Constantly changing as it is produced and reproduced, discovered as well as lost. Production and reproduction of knowledge include the generation of new knowledge and adaptation of existing knowledge to new conditions, the diffusion of such knowledge within the society as well as transfer to future generations.
6. Shared to a much greater degree than other forms of knowledge.
7. Local knowledge is usually asymmetrically distributed within a population e.g. by gender and age and preserved through distribution in the memories of different individuals.

There appears to be some contradiction between the last two points, which can be explained by the fact that within a certain group distinguished by gender, age or any other characteristic,
there is a great degree of knowledge sharing. However, the wider picture shows an asymmetrical distribution of knowledge.

Today many local knowledge systems are at risk of becoming extinct because of rapidly changing natural environments and fast pacing economic, political and cultural changes on the global scale. Many practices and ways of life are disappearing, as they do not match with foreign technologies or development concept designs. However people are beginning to realise that the short-term gains of new technologies are not capable of sustaining them, especially in most developing countries that face several political and economic disturbances. The rural poor have been the hardest hit as their livelihoods depend almost entirely on specific skills and knowledge essential for their survival. Local knowledge is being turned to and accepted as of great utility in sectors of agriculture, animal husbandry and ethnic veterinary medicine, use and management of natural resources and poverty alleviation (Kolawole, 2001; World Bank, 1997).

2.2 Local Knowledge Transfer

Local knowledge systems are still surviving and contributing to the sustenance of people’s lives in different parts of the world. These systems have survived from generation to generation through instruction (as in apprenticeships), practice and observation and communication through folk media and other traditional information exchange mechanisms (Hanyani-Mlambo and Hebinck, 1996). Transfer through oral tradition makes local knowledge to be vulnerable to rapid change especially when people are displaced or killed, or when younger generations acquire values and lifestyles that are different from their ancestors (IIRR, 1996). However the degree to which various societies depend on local knowledge varies, depending on many factors such as affluence, interaction with external systems, household characteristics, environmental settings etc.

Local knowledge systems were enhanced by people as they related their various family histories, taboos, symbols, myths/legends, rituals, sounds/dances, festivals, proverbs, poetry/literature, drama/art; folklore etc. For example local knowledge transfer played an important role in the survival of a cultural landscape “marais salants” in France until their decline (Thompson, 1999). In this landscape, knowledge of how to produce salt in the “marais” depended on personalized knowledge, a mixture of experience, subjective lore and
intuitive feelings, which implies that its transfer was always achieved by direct transmission through the generations (from father to son) rather than formal training (Thompson, 1999). The knowledge was acquired by observation, then by emulation, and effectively by osmosis in the course of discussion within the family and community.

Local knowledge transfer thus developed on a continuous flow of knowledge from generation to generation. Inherent in knowledge transfer is its inability to skip generations (Thompson, 1999). If a father dies without passing on his knowledge to his son, then the chain is effectively broken. This is clearly the case in fields of specialization, whereby the elder is the sole holder of that knowledge in contrast to general knowledge, which is known by many people. In Zimbabwe, socio-cultural beliefs played an important role in the conservation of natural resources. Local communities understood that their survival depended on living in harmony with their natural resources and their environment. In order to maintain that harmony, they evolved local knowledge systems based on conservation ethics expressed in taboos, rituals, customs, laws etc. and passed them by word of mouth. Traditional informal education was provided to the younger generations by their grandfathers, grandmothers, uncles, aunts and other elders in the community (IUCN-ROSA¹, 2001).

Children learn a lot from their elders as they perform many activities at home. Their participation in the labour process begins at an early stage. Almost as soon as children can walk, they are expected to help adults in their daily tasks. When physical capacities allow, play turns into work. In the course of general socialization, children of both sexes acquire the basic skills of cultivation, food processing and all essentially “female tasks” (Crehan, 1992), but after the age of 8-10, boys begin to lose interest in female tasks and girls continue to help their mothers and female relatives (Crehan, 1992, Simpson 1994).

Children are thus exposed to different communication channels as they grow. These channels are distinguished as:

- those maintained within the household.
- those maintained through the extended family and kinship ties.
- those of the various work groups and local social organization and
- those associated with religious affiliations and contacts with village elders.

¹ World Conservation Union’s Regional Office for Southern Africa
Each of these different channels serves as an important conduit in the exchange of information and materials (Simpson, 1994). Certain kinds of knowledge are contingent on experience which itself is mediated by the gender, ethnicity, class, academic discipline and geographical location of the experiencer (Reid, 1992).

2.3 Local Knowledge and Gender

Gender refers to the behavioural, cultural or psychological traits typically associated with one sex. Gender and local knowledge are linked in many ways, because knowledge is part of the social fabric in which people live, and gender is one of the primary dimensions of social fabric, making gender an important factor of local knowledge (Norem et al., 1989). Bodies of local knowledge are accessible, in the first place, to those members of a social group charged with specific resource management and production responsibilities (Fernandez, 1994). In this sense, local knowledge systems are by their nature gendered (Warren, 1989). Gender differentiation comes about as a result of the specific experiences, knowledge and skills which women and men develop as they carry out the productive and reproductive responsibilities assigned to them (Feldstein and Poats, 1988). The degree to which local knowledge is gendered varies from one society to the other depending on the degree of flexibility by men and women as they do their duties. Thus there is no such thing as a set of universal gendered local knowledge systems (Quiroz, 1994).

It is increasingly being recognized by researchers and grassroots workers alike, that in many communities, women are the primary natural resource managers, and that they possess an intimate knowledge of the environment (Mishra, 1994). Women are closer to nature because of the gender-based division of labour, and their role as they tend to the needs of the household. As important users and processors of natural resources, women are often the repositories of local knowledge on matters of sustainable resource management (IIRR, 1996). Women’s relation with and perception of the environment tends to be comprehensive and multidimensional, whereas men’s knowledge (notably of males involved in “western” profit-oriented agricultural production) tends to be one-dimensional, focussing on narrow areas such as cultivation of a certain kind of high yielding commercially profitable crop (Quiroz, 1994). FAO (1999a) also reported that women often have more highly specialized knowledge of wild plants used for food, fodder and medicine than men. Their role as caretakers for their families has encouraged them to learn how different parts of a plant can be used for food, medicine,
shelter and animal feed (Future Harvest, 2001). However both women’s and men’s generation, adoption and use of knowledge and technology are shaped by the economic, social, cultural, political and geographic contexts in which the two sexes live, but which each gender experiences in a different way (Appleton, 1993).

Women and men often possess different skills and knowledge of local conditions and everyday life. Women in developing countries have specialized knowledge and preferences - often complementary to that of men, which they use in their selection and adoption of decisions (Saad, 2001). Depending upon culture, some types of knowledge may be complementary, whereby both female and male knowledge systems are needed to understand the dimensions of production or decision-making, but there are at least four ways to think about gender differences in knowledge systems (Norem et al., 1989):

- A different knowledge of similar things.
- A different knowledge of different things.
- Different ways of organizing knowledge and
- Different ways of preserving and transferring knowledge.

2.4 Local Knowledge and Natural Resources Management.

Natural resources management refers to the self-conscious systematic utilization of a particular set of natural resources to achieve specific goals by resource managers. Resource managers vary from governments, non-governmental organizations, farmers, fishermen, pastoralists etc. Local knowledge managers, through the judicious use and understanding of natural resources perpetuated their existence. The conservation, management and use of resources such as vegetation, soil and land, water and wildlife, livestock, fishery etc. are enhanced through the use of local knowledge systems. Local knowledge is acknowledged as having fundamental importance in the management of local resources, and in the husbanding of the world’s biodiversity and in providing locally valid models for sustainable living (Turner et al., 2000). Many groups of traditional users used to monitor the status of the resource and changes of ecosystems. The proximity of users to the resource conferred an ability to observe day-to-day changes, either by the whole community or by selected individuals, such as community stewards and elders (Berkes et al., 2000).
Cultural beliefs based on local knowledge shaped the people’s perceptions and knowledge about natural resources. In Zimbabwe, studies have shown that some people protected trees because they believed that they bring rainfall by stopping clouds, as mountains do when causing rainfall (Makotose and Mukamuri, 1993). The same study and MDA (2000), showed that some people believed that big trees should be conserved because the cuckoo bird “hwaya” sings for rain and likes to rest in such trees, and that ancestral spirits “midzimu” come and rest in these trees when they attend rainmaking ceremonies. People also protected natural resources for fear of retribution and also out of respect for all life forms and the land itself (Turner et al., 2000 and Makotose and Mukamuri, 1993).

The resource base was maintained through managing keystone process tree species (Berkes et al., 2000). A study in Masvingo, southeast Zimbabwe, showed the use of more than ten indigenous trees for water conservation, forecasting and soil fertility (Makotose and Mukamuri, 1993). Agroforestry systems that combined food crops and domesticated trees were maintained. Despite the campaign by the colonial government to make people to clear them, local arguments about the value of trees were used to keep them in fields. Appreciated by ecologists only recently, succession management as exemplified by the shifting cultivation system, “milpa”, was used in Tropical Mexico (Berkes et al., 2000). Shifting cultivation was also used in some communities in Zimbabwe, but was abandoned because of pressure on the land resulting from overpopulation and the practice was seen as being destructive (MDA, 2000). The practice also lost its scope as people established permanent structures and projects in the areas they settled. Other farming methods that were environmentally friendly like zero-tillage were used. Local communities also based their farming practices on resource rotation and low external input agricultural systems. Soil fertility was maintained by the use of crop residues and organic manure and there were many ways of combating soil erosion like terracing, construction of contour ridges, afforestation etc.

The cornerstone of natural resource management based on local knowledge and skills and built through extended historical experience was violently disrupted by the emergence of colonial powers and nation states. Common lands and natural resources were taken over and traditional natural resources management systems fragmented virtually everywhere. The notion of local communities creating themselves around a body of natural resources that they could manage together was shattered.
2.5 Local Knowledge and Sustainable Livelihoods

Knowledge management is an integral part of achieving sustainable livelihoods. The term sustainable livelihood is defined as “the means, activities, entitlements and assets by which people make a living (Haug, 1999). There are five assets, which are included in this definition and are related to local knowledge. These are:

- **Human capital**: the skills, knowledge, and ability to provide labour and good health, which are important in the ability to pursue different livelihoods strategies.
- **Physical capital**: the basic infrastructure (transport, shelter, water, energy and communications), the production equipment and means that enable people to pursue livelihoods.
- **Social capital**: the social resources (networks, membership of groups, relationship of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods.
- **Financial capital**: the financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options; and
- **Natural capital**: the natural resource stocks from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity and wider environmental resources). (ACFR, 2000).

Livelihoods are considered to be sustainable when they are resilient to external shocks and stresses; are not dependent on external support; maintain the long-term productivity of natural resources and do not undermine livelihoods of or compromise the livelihood options open to others. This approach to sustainable livelihoods respects local knowledge as it gives strength to its four parameters. Local knowledge enables communities to capitalise on their other potential assets (ACFR, 2000). The combination of local knowledge with introduced knowledge or innovation generates an empowering environment and coping strategies to buffer against the forces, which threaten livelihoods and help in disaster aversion. It has been noted that introduced knowledge systems will only grow if traditional cultural anchors are properly located. Local knowledge provides “grammar” while technology provides new words (Mahale and Soree, 1999) where benefits can only be realised by blending the two.
Sustainable rural development aimed at improving the quality of life of low-income people is multifaceted, taking into account such disciplines as agriculture, medicine, technology, politics, economics, sociology and education (Kolawole, 2001). This holistic approach to livelihoods is based on an understanding of the influence of local knowledge. On the other hand, all livelihoods are vulnerable to shocks, trends and seasonality and are particularly prone if they are poor and faced with a non-empowering environment. Macro-economic measures, globalisation trends and social powers all compound the dilemma.

Food security is regarded as a subset of livelihood security (Haug, 1999). The value and potential contribution of local knowledge in food security across the region of southern Africa has been demonstrated in various countries. In Binga, Zimbabwe, a locality with little external influence, local knowledge systems are key elements in assuring food security to the local people (IUCN ROSA, 2001). Traditional practices based on the local knowledge, have a significant value and are applied in crop production and distribution (pest management, harvesting and grain storage). Local knowledge can also be applied in cattle production (reproduction, calving, disease control and grazing of livestock). Local knowledge based on ethno-biology has been used to understand traditional medicines and methods of health care, family planning etc. In Masvingo, Zimbabwe, the wild custard apple tree, “muroro”, was used as medicine for expectant mothers (IUCN- ROSA, 2001).

2.6 AIDS in Zimbabwe

AIDS (Acquired Immune Deficiency Syndrome) has had devastating effects on many nations especially those in the developing world. Of the 36,1 million people living with HIV/AIDS, an overwhelming 95% live in developing countries. 25,3 million of those infected with the virus live in sub-Saharan Africa (FAO, 1999b).

Zimbabwe has a total population of about 13 million of which almost 60% are over 15 years old. At the end of 1999; 1,4 million Zimbabweans, one in four people aged between 15 and 49 were believed to be living with HIV/AIDS. Zimbabwe has one of the highest HIV infection rates in the world, with more than 26% of the sexually active population living with HIV (Page, 2001). Each year over 100 000 Zimbabweans die from AIDS, 700 die every week and another 2 000 contract HIV every week (UNAIDS/WHO, 2000).
The impact of HIV/AIDS has been multi-dimensional in that it has affected many sectors of the economy, livelihoods and food security. The links between AIDS, food insecurity and poverty are strong and deadly (FAO, 1999b). Various economic sectors in the fields of agriculture, mining, education etc are greatly reduced as the productive age is affected. Farming and other production activities are affected. The crops in the fields are negatively affected as well as the nutrition and income of the family. Simultaneously, the affected family will require money for medication and other expenses and the funerals that follow are expensive making the families more impoverished. Knowledge is also lost because as adults fall ill and die, young children are not learning the skills or absorbing the knowledge they need to work on the family farms (Cherfas, 2001a). HIV/AIDS is no longer restricted to cities. The disease is now spreading with alarming speed into rural areas and affects the farming population, especially people in their most productive years; age 15 to 45 (Baier, 1997).

Rural communities have been the most affected in carrying the burden of the cost of the disease as many urban dwellers and migrant labourers return to their villages of origin when they are ill. Besides affecting the infected person, HIV/AIDS is affecting communities and families. Women and children’s welfares have been the most affected by the disease. Biology and society conspire to make women and girls more vulnerable to AIDS than men and boys (Cherfas, 2001a). Women, who already bear most of the burden of feeding and nurturing their families, lose time as they care for their dying husbands and kin.

Before AIDS, about 2% of children in developing countries were orphaned and in 1997, national rates as high as 11% where recorded in some countries. Many orphaned children live in impoverished or otherwise difficult circumstances (Foster, 2000). At the end of 1999, there were 623 000 AIDS orphans in Zimbabwe and 56 000 children aged between 0-15 years who had been infected with HIV/AIDS (UNAIDS, 2000). Since the beginning of the epidemic, the estimated number of children who had lost their mothers or both parents, while they were under the age of 15 was 900 000 (UNAIDS, 2000). In Mutare, Zimbabwe, 1 in every 6 children is an AIDS orphan (UNAIDS, 2000). The orphans’ households change as they may live alone, with elderly grandparents or with sick caregivers.
Chapter 3: Study Area

3.1 Study Area

3.1.1 Population Profile

The fieldwork was conducted in Manicaland Province (Figure 2), commonly known as the Eastern Highlands of Zimbabwe. Manicaland is one of the ten administrative provinces into which Zimbabwe is divided. Decentralisation endeavours resulted in the provinces being subdivided into districts, which were further divided into wards, which in turn are constituted by villages. Households make up villages and individuals constitute households. This outline forms the organizational hierarchy of administration.

Manicaland Province is made up of nine districts, which make up the province’s total population of 1 537 224 million according to Central Statistical Office Records (CSO, 1992). This province has the highest population density in the country (42,2 persons per square kilometre). The national average density is 27 persons per square kilometre. My study was centred in one of the nine districts, Mutare Rural District. This district has a total population of 204 803 people which is about 13% of the provincial population. The population density of the district is 59 persons per square kilometre. The district is made up of 41 wards and my work was in two wards, Nyachityu and Takarwa. These wards are found in Marange Communal Area (figure 3), which lies between longitudes 32°15’ E and 32°30’E, and between latitudes 19°15’S and 19°30’S. Marange Communal Area is in the southwest of Mutare, which is the provincial capital city of Manicaland. The people speak Shona with a Chibocha dialect.

Table 1: Population characteristics of Nyachityu and Takarwa wards

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Nyachityu ward</th>
<th>Takarwa ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>3 233 (53,41%)</td>
<td>2 865 (53,15%)</td>
</tr>
<tr>
<td>Males</td>
<td>2 820 (46,59%)</td>
<td>2 525 (46,85%)</td>
</tr>
<tr>
<td>Total population</td>
<td>6 053</td>
<td>5 390</td>
</tr>
<tr>
<td>Sex ratio</td>
<td>87,23</td>
<td>88,13</td>
</tr>
<tr>
<td>Average household size</td>
<td>5,2</td>
<td>5,1</td>
</tr>
<tr>
<td>Total households</td>
<td>1 168</td>
<td>1 047</td>
</tr>
</tbody>
</table>
Figure 2 Map of Zimbabwe showing Manicaland Province and its Districts  (Source: CSO, 1992).
3.1.2 Socio-economic Characteristics

The people of Marange depend largely on subsistence farming for their livelihood. They grow dry-land crops, amongst them maize, groundnuts, bambara nuts, cowpeas, sorghum and millet, and vegetables. Fruit trees such as mango, citruses, paw paw etc. are also planted on homesteads. Subsistence farming is mixed with keeping of cattle, goats, poultry, sheep and donkeys. Nyachityu ward has a mature community plantation from where the community gets an income and wood resources for domestic use (Mutepfa, 2000; UNDP, 2001).

Most households rely on family labour to perform farming activities. However during the peak-farming season, outside labour may be hired to lessen the burden or family labour can be hired out so as to get income. Other families that can afford to do so may hire a servant on a
permanent basis to help with household chores and other duties like livestock herding. Most of the households have a dual production and consumption component, such that most of the produce is for the family and not for financial gains. Produce is sold when there is surplus production and this is usually done within the community, although some households occasionally sell to the Grain Marketing Board (GMB) or transport the goods to the big green market in Mutare.

The Zimbabwean culture basically puts the responsibility of financially providing for the family on the man’s shoulders. This has resulted in many men leaving their families in the rural areas and going off to urban areas and other places in search of employment. This notion is changing as women are also becoming economically active especially in the urban areas. The women in the villages are left to fend for the family and wait for monthly or weekly remits from husbands. This has resulted in many rural households being female headed and has also exacerbated the AIDS epidemic (Arlac, 2001). Female-headed households constituted 47.3% of the rural households in the province (CSO, 1992). The province is recognised as one which is most affected by the HIV/AIDS epidemic. The prevalence of HIV infections among women attending antenatal care in the province in 1999 was as high as 37% (UNAIDS, 2000). Currently over two-thirds of medical admissions in Manicaland are thought to be HIV related (Makufa, 2001). This has resulted in many orphans in the province whereby 1% of households were headed by children below the age of 15, 5% were headed by children aged between 15-19 and 9% of households were headed by people in the 20-24 age group (CSO, 1992).

3.1.3 Community Interactions

There is a high component of reciprocity amongst the people. This is found in such community activities like the rainmaking ceremony “kupepera”, taking care of the old and disadvantaged community members and other social network enhancing activities. However, some villages in Nyachityu ward have abandoned the rainmaking ceremony (MDA, 2000). Mutual aid groups “nhimbe”, formed amongst different households during planting, weeding and harvesting periods increase interactions. This practice is fading with time, but despite changes, the community social network is still maintained by village meetings called by the traditional and government administration leaders. The community cooperates in other activities, be they for joy like wedding parties or for sorrow like funerals.
Most residents of Marange communal area are Christians. The most common denominations are Johanne Marange Apostolic sect, which is an African Independent church that was founded in Marange and has spread in the southern part of the continent. The other denominations are Roman Catholic, Protestants like Anglican and Methodist, Seventh Day Adventist (SDA), Pentecostal churches and various emerging charismatic churches. Like most Zimbabweans, many of these Christians practise religious syncretism as it was noted that, although a substantial portion of the Zimbabwean population today belongs to a Christian congregation or church, people retain many of the traditional customs and beliefs in traditional religion (Arntsen, 1997).

3.1.4 Infrastructure and Service Provision

Nyachityu ward residents are close to the tarmac road that links Marange communal area to the provincial city. Public transport is easily obtained and commuter buses are available on a short time interval basis. The good road infrastructure facilitates trade and social mobility. The main business centre, Marange Business Centre is found in Nyachityu ward, and there are other small shopping centres. Also found at Marange business centre are the district hospital and a vocational training centre. Takarwa ward is not easily accessible with its dirt road, which becomes slippery in the rainy season. This may cut off villagers from communicating with outside communities.

Nyachityu ward is serviced by three primary schools that are separated by distances of two to four kilometres. These are Mount Makomwe, Bemhiwa and Zedza. Adjoining Mt Makomwe primary school is Marange High School. From Bemhiwa, the nearest school in Takarwa ward is Chikwariro, which is more than ten kilometres away, which means that pupils between these two areas walk long distances to access schools. Chikwariro Primary is next to Chikwariro Secondary School. The SDA church runs Bemhiwa and Chikwariro schools whilst the Methodist Church runs Mt. Makomwe Primary and Marange High Schools. Zedza is a council run school. The schools do not have telephone services except Marange High and the district hospital. Unreliable public telephones are available at Marange Business Centre. The district hospital, business centre, high school and employees’ residential houses are electrified. A few homes in the community use solar energy for light, but the majority use paraffin and candles and firewood for cooking.
3.2 Physical Characteristics

3.2.1 Climate

Marange Communal area lies in natural region three according to the five agricultural regions into which Zimbabwe is divided. This classification depends on the variation of the normal tropical continental climate due to the altitude of the country. This region receives annual rainfall that ranges from 650-800mm mostly in the form of infrequent heavy storms. These climatic conditions favour semi-extensive farming systems. Rainfall comes between the months of October to March. The area is prone to severe drought spells and the drought cycles have become shorter in recent years. Severe mid-season dry spells are common, and as a result good farm management practices are required to retain moisture during the growing season. Mean maximum and minimum temperatures are 27°C and 12°C respectively. The hottest months are August to October and the coldest are May to June.

3.2.2 Altitude

The mean altitude is 1200 metres above sea level (a.s.l.) and ranges between 1000 metres and 1700 metres a.s.l. The topography varies from gently undulating to broken country. Most of the area is in low-lying ground, and the peaks are observed in the numerous granite outcrops and mountains in Nyachityu ward. The widest range of mountains is Nyaruhwe, which rises from 1200 to the highest point of 1700 metres a.s.l. Other mountains are Mt. Makomwe, Nyamhanza, Nhengwe and Bokosi. Nyaruhwe and Nhengwe are considered as sacred mountains.

3.2.3 Geology and Soils

The rocky boulders and stones scattered at roadsides and places close to the mountains are an evidence of the underlying igneous basement rock. This has given rise to the soil type in Marange communal area to be mostly sandy with some microenvironments of heavy black or red soils, loam soils and clay. The sandy soils are deep, have poor nutrient reserves and are of low water holding capacity. The soils are highly vulnerable to sheet erosion, and gullies are a common site in the area.
3.2.4 Vegetation

The vegetation in the low-lying lands is dominated by shrub savanna which progresses into miombo woodland characterised by *Brachystegia* and *Julbernadia* species in the kopjes and mountains. Thorny bushes of the genera of *Acacia, Dichrostachys, Maytenus, Combretum, Terminalia, Gardenia* and others dominate the shrub vegetation. Dotted in the fields are big trees of *Kigelia Africana, Parinari curatellifolia* and *Lonchocarpus capassa* and some fruit trees. The edges of the fields are common habitats of wild indigenous fruit trees like *Vanguesta infausta, Azanza garkeana, Aframomum angustifolium* and many others. Although the vegetation is predominantly bushy, isolated large fruit trees of *Berchemia discolor, Diospyros mespiliformis* and *Adansonia digitata* are found in many places. Herbs of the genera of *Bulbophyllum, Solanum, Flacourtia, Eriosema* and *Lippia javanica* dominate the herbaceous vegetation. The grass varieties are short, dry species of *Cynodon* and *Digitaria* and few areas have tall *Hyparrenia spp.*

3.2.5 Water Resources

Water plays an important role in the lives of the people of Marange as in other parts of the world, and more so in this drought prone area. The streams are seasonal such as Chikadzi, Mvuramachena and Nyakahuni, which run through Nyachityu and Takarwa wards. These are usually without water at the peak of the dry season in September. The big river in the area, Muroti, is reduced to a trickling stream at this time of the year. This phenomenon led Nyachityu community to construct a weir, which greatly improved the water situation (UNDP, 2001). The integrated water-harvesting project resulted in a reliable source of water for domestic purposes, livestock and gardening. Market gardening, fish farming and afforestation have improved the livelihood component (UNDP, 2001). Other donor organizations and SDA church projects target borehole drilling which have helped the people. People obtain drinking water from these boreholes and the water is usually hard, tasteless and salty. Some places have springs that produce cold and nice water like the springs found close to Mt. Makomwe Primary School. Wells have also been dug in the few wetlands and these satisfy the purposes of gardening, livestock and human use.
3.2.6 Natural resources management

Communal areas comprise approximately 42% of all the land in Zimbabwe (Gore, Katerere and Moyo, 1992). The land tenure system in these areas is a result of the evolution of the traditional customary tenure system (Rukuni, 1994). Peasant farmers occupy communal areas where they cultivate small fields (approximately up to 2.5 hectares) allocated to them by community leaders. The farmers till the land and raise livestock for subsistence and marketing. The communal farming sector comprises of the tribal trust lands (TTL), resettlement schemes and cooperatives. TTLs existed before independence when land was given to a person by birth-right (Mheen-Sluijen, 1999). The person used it after his own will, but because there were no title deeds, it could not be sold.

Presently, the President of the country holds communal areas in trust for the people (Mutepfa, 2000) and devolves the power to the local district council. In reality, communal people see all land as belonging to the local traditional leadership. The management of land and natural resources varies in different communal areas depending on the level of organization and the leadership within the community. The Natural Resources Act of 1941 (amended in 1995 and 1981) governs natural resources management and it states that the administrative authority for the communal areas is the Rural District council. Each village is required to elect a village development committee (VIDCO) which reports to the ward development committee (WADCO). These committees work with the communities in formulating and enforcing local by-laws relating to natural resources conservation and utilisation. Control measures are put in place that relate to the exploitation of natural resources such as trees, wildlife and soil. In Nyachityu Ward, the local conservation committee (LCC) “majengatavhu” carries out this responsibility.
Chapter 4: Methodology

4.1 Methodology

The aim of this chapter is to describe the data gathering methods that were used, problems encountered during this period and limitations of the methodology. The last part of the chapter will be devoted to explain how the data was handled after collection and the analysis methods that were used.

4.1.1 Selection of the study area

The study area was selected based on the findings of earlier research work on local knowledge held by the people of Nyachityu ward, which was done by MDA in 2000. The geographical location of Marange communal area and the schools were data collection took place were important factors to be considered. Information could be gathered from a variety of settings in the community. The researcher had the advantage of previous knowledge about the area and although it was not from working experience, it was useful for the purposes of familiarising with the study area. The research area was easily accessible by both private and public transport. The local traditional leader in Nyachityu Ward was aware of the nature of the work from the previous case study, which had been done by MDA. This greatly reduced the burden of bureaucratic procedures before commencing data collection.

4.1.2 Data collection methods

Information was collected from secondary data sources and primary sources during a questionnaire survey with the respondents. Community activities were observed as well as random field sampling of the vegetation and other characteristics of the physical environment.
4.2 Secondary data collection

Secondary data was gathered from published reports of work that had been done in Marange communal area by other researchers like the MDA through a FAO-funded project, and literature from other organizations. Maps where obtained from the Surveyor General’s office and information on the provincial population profile was obtained from the Central Statistics Office (CSO).

4.3 Primary Data Collection

4.3.1 Sampling Preparations

Questionnaire interviews were used to obtain detailed information from the respondents regarding their backgrounds, local knowledge on natural resources management, socio-cultural beliefs and perceptions towards local knowledge. Four primary schools were selected in Marange communal area. These were Bemhiwa, Mt Makomwe, Zedza and Chikwariro. The local traditional leader in Nyachityu Ward, Ishe Hama, was the first person to be visited and told about the intentions of the study. He agreed that the study was important and offered to introduce the researcher to the school heads of Zedza and Mt. Makomwe schools. The headmasters also accepted the purposes of such research work and briefed the other teachers. Appointments were made with the school heads on the convenient dates for interviewing the pupils. At the schools, pupils aged between 9-14 were targeted as a previous study had shown that this class would be knowledgeable about the questions in the interview. This age group falls in between grades 4-7 according to the education system in Zimbabwe. A pre-test was done before the agreed dates for sampling to judge if the questions were not ambiguous and if any modifications were required.

4.3.2 Research Design: Stratified random sampling

The experimental design was set up so that it would satisfy the study purpose of investigating the dependency of various aspects of local knowledge on factors relating to household characteristics and gender. The pupils in the grades of interest were stratified by the respective teachers (as they usually know pupils’ backgrounds) according to sex of the pupil, sex of the
household head, pupil’s relationship to the household head and denomination. The teachers would then randomly select the pupils and send them individually to the place where the questionnaire (Appendix 1) was administered to them. Respondents were asked the questions by the researcher after which they would go back to the classroom to call the next pupil who the teacher had selected. Respondents were not supposed to discuss their responses and the involvement of teachers ensured a smooth flow in selecting pupils with a minimal interruption of classroom activities. It was stressed to the teachers that pupil alertness in class was not of importance for the purposes of the study.

Five research assistants were hired to administer the questionnaire to the pupils. Two of the research assistants were not from Marange area and the researcher discovered that it would have been best to hire local residents only. Local research assistants made data collection operations to be smooth and pupils were at ease when they identified with the interviewer. Local research assistants were familiar with the area and local terminology. All the research assistants were required to be able to read and write and to communicate effectively the questions and purposes of the survey to the respondents. The research assistants were trained prior to the study so that they were well orientated about the aims of the study and understood the questions in the local context.

4.3.3 Household Questionnaire Survey

After administering the questionnaire to pupils, issues were raised that made it of interest to understand the perceptions of adults about local knowledge. Questions that were almost similar to those that had been asked to the pupils were asked to the adults (Appendix 2). Questions that were not relevant to the adults were left out and the adult interviews were more of a discussion to hear their thoughts on local knowledge on a broader basis than for pupils. Respondents were randomly selected in Marange communal area and the interviews were done at their homesteads.
4.3.4 Field Survey

Some walks were taken in the area in order to know about the vegetation, the soils, and water sources. This was done with a member of the community. Scientific methods were not used in sampling, as the objective was not to quantify attributes, but to familiarise with the area and understand the responses that were given.

4.4 Data Analysis

The information gathered from the questionnaire survey of the pupils was coded and was entered into Ms Excel worksheets. The data was then transferred to a Minitab 13 worksheet. This statistical package was used for descriptive statistics and statistical analysis. The Chi-squared test for independence was used to provide evidence of a statistical association between the various responses and the factors that were thought to be determinants of the responses. The Chi-squared statistical test was used to test the null hypotheses of independence:

Ho: responses to various aspects of local knowledge are independent of respondent’s age, denomination, locality, gender and family structure.

This was tested against the alternative hypothesis stated as:

H₁: local knowledge transfers about socio-cultural beliefs and management of natural resources are dependent on age, religious affiliation, locality, gender and family structure.

The test measured the overall discrepancy between the observed and expected frequencies at the 5% level of significance.

4.5 Limitations of the Study

The study methodology had some limitations. The selection of pupils by teachers was biased in that teachers tended to select the academically capable pupils in their classes, although it had been pointed to them that the responses that were of interest in the study were not directly related to academic performance. The pupils also felt that there were some expected responses that reflect high IQ and some were not comfortable about saying the reality. There is an error associated with hiring research assistants to complete the questionnaires. The researcher
would have administered all the questionnaires because of being the most familiar with the data requirements and consistency in data collection, but time was the constraint. The methodology required that respondents should not consult each other, and this made it mandatory to have research assistants. There was unequal sampling of the pupils especially with regards to family structure as most respondents tended to fall in two of the four classes of family structure.

When discussing with some adults, especially those who were community experts in human medicinal plants, they were not willing to share their knowledge. One old woman who is a mid-wife and helps pregnant women during pre-natal preparations and also knows a lot on medicinal plants for baby ailments felt that it would be “exposing one’s self” if she was to share her knowledge as that was her source of power and respect within the community.
Chapter 5: Results

5.1: General Characteristics

The pupils’ background characteristics were used to stratify them according to factors that might influence levels of local knowledge about management of natural resources and socio-cultural beliefs. The characteristics of the 577 respondents that were interviewed, according to the categories of interest are shown in table 2:

Table 2: General characteristics of the respondents

<table>
<thead>
<tr>
<th>Category</th>
<th>Class</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship to the household head</td>
<td>Child</td>
<td>241</td>
<td>184</td>
<td>425</td>
<td>73.7</td>
</tr>
<tr>
<td></td>
<td>Grandchild</td>
<td>54</td>
<td>55</td>
<td>109</td>
<td>18.9</td>
</tr>
<tr>
<td></td>
<td>Other(^2)</td>
<td>15</td>
<td>10</td>
<td>25</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Sibling</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>3.1</td>
</tr>
<tr>
<td>Sex of the household head</td>
<td>Female</td>
<td>133</td>
<td>101</td>
<td>234</td>
<td>40.6</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>183</td>
<td>160</td>
<td>343</td>
<td>59.4</td>
</tr>
<tr>
<td>Denomination</td>
<td>Johane Marange</td>
<td>49</td>
<td>43</td>
<td>92</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>SDA</td>
<td>84</td>
<td>64</td>
<td>148</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Catholic and Protestant</td>
<td>80</td>
<td>71</td>
<td>151</td>
<td>26.2</td>
</tr>
<tr>
<td></td>
<td>Pentecostal</td>
<td>41</td>
<td>40</td>
<td>81</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Apostolic Churches</td>
<td>62</td>
<td>40</td>
<td>102</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>Non-Christian</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Schools</td>
<td>Bernhiwa</td>
<td>59</td>
<td>64</td>
<td>123</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>Chikwariro</td>
<td>99</td>
<td>61</td>
<td>160</td>
<td>27.8</td>
</tr>
<tr>
<td></td>
<td>Marange</td>
<td>76</td>
<td>65</td>
<td>141</td>
<td>24.4</td>
</tr>
<tr>
<td></td>
<td>Zedza</td>
<td>82</td>
<td>71</td>
<td>153</td>
<td>26.5</td>
</tr>
<tr>
<td>Grades</td>
<td>Four</td>
<td>90</td>
<td>64</td>
<td>154</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>Five</td>
<td>80</td>
<td>63</td>
<td>143</td>
<td>24.8</td>
</tr>
<tr>
<td></td>
<td>Six</td>
<td>72</td>
<td>68</td>
<td>140</td>
<td>24.3</td>
</tr>
<tr>
<td></td>
<td>Seven</td>
<td>74</td>
<td>66</td>
<td>140</td>
<td>24.3</td>
</tr>
</tbody>
</table>

\(^2\) Refers to other caregivers that are not grandparents. These can be aunts, uncles and some other elders who look after the orphans.
5.1.1: Effect of Family Structure

**Objective 1:** Investigate the influence of family structure and relationship to household head on the transfer and survival of local knowledge.

The relationship of a respondent to the household head has an important bearing on the closeness of their relationship and will affect their interaction. This would be important in the survival of local knowledge, as the practices of the household head should greatly influence the level of knowledge possessed by the respondent, which would be influenced by the strength of the bond between them. The way of life that the household head exposes the children to in his/her daily activities should influence their understanding of life. Children learn from the household’s practices, which become a part of their lives as they pursue viable livelihoods.

The responses that were reported by many of the respondents were insignificantly dependent on the relationship to the household head. Family structure was not a significant determinant of the local knowledge possessed about management of natural resources such as water, soil, wildlife and forests, participation in farming activities and hunting and gathering food and fruits from forests. Only two variables were associated with the family structure. These were participation and knowledge of the practice of telling folk stories, and tree species that are not used for firewood.

The practice of telling folk stories is commonly done during the evenings before people retire for the night. Grandparents and other elders usually narrate the stories, but children also participate as they retell stories that elders would have told them either at home or at pre/schools where teachers read folklore to pupils. In some homes, the respondents reported that each member of the family was given an opportunity to tell a story and they competed in telling the most interesting story. About 84.9% of the respondents reported that they practise this in their homes and added that, the type of stories differed depending on who was relating it. Grandparents told stories related to the past, whilst their parents related to the modern things and the respondents’ stories tended to be “very modern”. Those staying with parents reported that they listen to the radio or watch television at night resulting in a lower participation in this practice. Fully employed parents may have carry work from the workplace, which is usually the case with teachers, and this affects family participation in
such activities. There was a high dependence of participation in folklore on the family structure as indicated by the low p-value in table 3.

Table 3: Percentages of respondents that participate in telling folk stories.

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Participate</th>
<th>Don’t participate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td>81,9</td>
<td>18,1</td>
<td>100</td>
</tr>
<tr>
<td>Grandchild</td>
<td>94,5</td>
<td>5,5</td>
<td>100</td>
</tr>
<tr>
<td>Other</td>
<td>96,0</td>
<td>4,0</td>
<td>100</td>
</tr>
<tr>
<td>Siblings</td>
<td>83,3</td>
<td>16,7</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 13,3; DF= 3; P-value = 0,004

The people of Marange communal area collect fuel from the forests and some tree species are not supposed to be used as firewood. Examples were *Maytenus senegalensis* whose local name “musosawafa” means the tree that is used to fence the graveyard, *Pseudolachnostylis maprouneifolia* “mushonjiwa” and *Lonchocarpus capassa* “munyamharadzi”, which means, “that which destroys”. About 62% of the respondents who stay with their parents could name at least one tree that is not used for firewood, whilst 58,7% of grandchildren, 52% of those that stayed with other relatives and 66,7% of those that stayed with siblings could do this. There was a significant difference between these responses (Chi-square = 17,203; DF = 2; P-value = 0,009) amongst the respondents. The association of this knowledge on family structure was not expected.

In an attempt to compare and explore further the effects of family structure on the level of local knowledge, all the respondents that were not living with parent(s), were put in one category so that they could be compared with those in a parent-child relationship. For all the variables, the statistical result showed that the type of relationship does not affect the level of local knowledge and high probability values were observed. This supported the earlier result, which showed that the family structure might not have a major effect on the transfer of local knowledge about socio-cultural beliefs and management of natural resources.
5.1.2: Influence of Gender on the transfer of local knowledge.

5.1.2.1: Influence of sex of the household head on the survival of local knowledge.

Gender differences have an important effect on the level of local knowledge as men and women perform different tasks in everyday life. The sex of the household head significantly affected some aspects of local knowledge. Amongst the people of Marange communal area, the local leaders have conservation enforcement committees that ensure that conservation bylaws are observed. These committees are usually composed of men. When the respondents were asked about their knowledge about these committees, about 41.4% of the respondents reported that they were aware of the committee’s duties and responsibilities. Sex of the household head significantly affected the respondent’s awareness of the local conservation committee (Chi-square = 7.298; DF = 1; P-value = 0.007), as more respondents from male-headed households were aware of these committees than those from female headed ones. Figure 4 shows the association between the knowledge about the local conservation committee (LCC) and sex of the household head.

![Figure 4: Dependence of knowledge about LCC on the sex of the household head.](image)
With the intensification of agriculture, many farming communities began to combine organic soil fertility maintaining methods with the use of chemical fertilizers and the degree of the combination varies from household to household. This may be affected by the affluence of the household considering the high cost of agricultural inputs. About 59.1% of the respondents reported that they maintain soil fertility using organic sources of nutrients only such as anthill soil, leaf litter, crop residue and livestock dung. About 39.9% were combining organic soil nutrient management with chemical fertilizers and about 1% reported that they only used chemical fertilizers as the source of soil nutrients. Table 4 shows the association between soil fertility maintaining methods and the sex of the household head.

Table 4: Percentages of methods of maintaining soil fertility and sex of household head

<table>
<thead>
<tr>
<th>Soil Fertility Method</th>
<th>Female-headed household</th>
<th>Male-headed household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical fertilizer only</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Organic nutrients only</td>
<td>65.7</td>
<td>44.3</td>
</tr>
<tr>
<td>Chemical and organic nutrients</td>
<td>33.5</td>
<td>54.5</td>
</tr>
</tbody>
</table>

Chi-square = 16.284; DF = 6; P-value = 0.012

The soils of Marange are prone to erosion and this causes big and small gullies to form, which require to be filled. About 92% of the respondents reported that gullies could be filled with stones, bricks, soil and maintaining vegetation. Between the two sexes of household heads, about 90.5% of the respondents from female-headed households knew these methods, whilst 93.9% of respondents from male-headed households possessed this knowledge. There was a significant dependence of this knowledge on the sex of the household head (Chi-square = 8.154; DF = 4; P-value = 0.007) probably because the responsibility of filling gullies is usually left to men and boys. Women and girls may assist by collecting the material for this and they may fill small gullies that develop on the homestead, but men as joint community projects fill big gullies that develop in the area.

Carpentry and craftwork is done using special tree species as people make wooden items like spoons, cooking sticks, yokes, stools and other items. About 77.5% of the respondents knew at least one indigenous tree that is used in craftwork and 5.6% could only name exotic trees. Men do most of the craftwork jobs, boys usually learn from the male elders, and they start with small items then develop to bigger things with experience. Some of the men do this as a way of getting income for the family and they sell these items within the community or travel.
to other places to sell their goods. There was a significance dependence of knowledge about trees used in carpentry on the sex of the household head (Chi-square = 13,789; DF = 4; P-value = 0.008) as shown in Figure 5.

![Knowledge of carpentry trees](image)

**Figure 5: Dependence of knowledge about carpentry trees on sex of the household head**

Awareness of forest conservation strategies was also dependent on the sex of the household head. About 86.9% of the respondents knew at least one method that can be used to conserve forests with the most common methods mentioned being reforestation and prohibitive by-laws that are enacted by the local traditional leaders. The people in the community have been encouraged to have tree plantations at their homesteads and most families grow *Eucalyptus species* and fruit trees, and a few prefer indigenous trees. Some respondents even knew the amount of money that has to be paid to the chief for someone to be allowed to selectively cut down trees, which shows the prevalence of this exercise. Almost equal proportions of respondents from male- and female-headed households were aware of at least one strategy that is used to conserve forests. However, those from male-headed households knew more methods than those from female-headed households as, 34.3% of the respondents from these households could name two or more methods, in comparison with 17.3% from the latter. This resulted in a significant dependence of this knowledge on the sex of the household head (Chi-square = 24,776; DF = 4; P-Value = 0.000), probably because men perform the task of cutting down big loads of wood from the forests and use ox-drawn scotch carts to transport the wood. The large loads of wood may be used as poles for fencing or building, or burning bricks, but women collect small amounts of dead wood that is needed daily for food preparation.
The people of Marange communal area like most rural households supplement their food supplies with delicacies from the wild such as mushrooms. Most of the respondents could name some edible mushrooms and their locations. There was no significant association of knowledge about edible mushrooms on the sex of the household head. About 89.8% of the respondents could name at least one edible mushroom with some respondents naming as many as four. This knowledge is so widespread amongst the respondents that about 74.3% of the respondents named between two and five types of edible mushrooms. The most commonly named edible mushrooms were sticky top, *Amanita zambiana*, *Cantharellus spp*, *Termitomyces spp* and *Macrolepiota zeyheri*. However, knowledge about the location of the mushrooms was highly dependent on the sex of the household head (Chi-square = 1.822; DF= 6; P-value = 0.012). Figure 6 shows how the knowledge about location varied with sex of the household head.

During the rainy season, there are food supplements of indigenous vegetables and insects that come out after the first rains. Different methods are used to trap the insects and these are aimed at mass capture, although children may run after the insects for fun and catch small amounts. For mass capture of these insects, light and big containers filled with water are used so that the insects are attracted to the light, fall in the water rendering them inability to fly. About 74.2% of the respondents were aware of the relationship between these insects and the first rains and responses on how to capture them varied between the two scales of capturing the insects. Table 5 shows how the responses depended on the sex of the household head.
Table 5: Percentages of knowledge about capturing edible insects and sex of the household head.

<table>
<thead>
<tr>
<th>Response</th>
<th>Female-headed household</th>
<th>Male-headed household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass capture</td>
<td>71.9%</td>
<td>74.8%</td>
</tr>
<tr>
<td>Small scale</td>
<td>12.7%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>15.4%</td>
<td>8.2%</td>
</tr>
</tbody>
</table>

Chi-square = 8.086; DF = 2; P-value = 0.018

Respondents had different perceptions about the trend in changing levels of local knowledge from generation to generation. About 74.8% of the respondents felt that the trend has shown decreasing levels of local knowledge possessed by children over the years. About 12.2% of the respondents felt that there were no differences in the levels of knowledge and 13.0% could not give an opinion. The perceived trends in changing levels of local knowledge depended on the sex of the household head as shown in table 6.

Table 6: Percentages of opinion about trend in local knowledge and sex of the household head.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Female headed</th>
<th>Male headed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreasing</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>No change</td>
<td>6.5</td>
<td>16.1</td>
</tr>
<tr>
<td>Don’t know</td>
<td>18.5</td>
<td>9.1</td>
</tr>
</tbody>
</table>

Chi-square = 20.098; DF = 2; P-value = 0.000

The HIV/AIDS epidemic has caused a lot of suffering in Africa resulting in a lot of information about the diseases at people’s disposal. Thus many respondents were aware of AIDS, but some were not. Amongst the respondents, a high level of awareness was observed. About 89.4% of the respondents reported that they were aware of AIDS whilst 10.6% reported their unawareness. Awareness of AIDS was highly associated with the sex of the household head (Chi-square = 8.114; DF = 1; P-value = 0.004). There were different places from which respondents reported that they got information about HIV/AIDS such as at home, school, through the media (television, radio, films and posters), clinic and at the church. About 60% of the respondents reported that they got their information from schools and at home, 7.7% from the media and 2.5% from the churches and clinics. More respondents from male-headed households learnt through the media whilst those from female headed ones learnt at home from talking to elders, and thus the places where the respondent learnt about AIDS depended on the sex of the household head ($\chi^2 = 19.687; DF= 8; P$-value = 0.012).
5.1.2.2: Investigate the influence of sex of the respondent on local knowledge survival.

The knowledge that a respondent possessed depended on their sex as different sexes perform different duties and responsibilities at home, which will determine their awareness of certain practices, most of which are related to local knowledge. The sex of a respondent affects the relationship they have with the various holders of local knowledge at home. It is usually the case that girls are closer to female elders and boys to the male elders although there may be exceptional cases. In order to assess who “teaches” children the most about management of natural resources using local knowledge and socio-cultural beliefs, the respondents were asked to rank their teachers at home. The one who teaches the most was given rank order 1 with increasing numbers for those that teach the least. The results of the responses are shown in tables 7 and 8.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother</strong></td>
<td>91</td>
<td>31</td>
<td>18</td>
</tr>
<tr>
<td><strong>Father</strong></td>
<td>25</td>
<td>46</td>
<td>20</td>
</tr>
<tr>
<td><strong>Sister</strong></td>
<td>52</td>
<td>31</td>
<td>35</td>
</tr>
<tr>
<td><strong>Brother</strong></td>
<td>22</td>
<td>42</td>
<td>32</td>
</tr>
<tr>
<td><strong>Grandmother</strong></td>
<td>42</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td><strong>Grandfather</strong></td>
<td>9</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td><strong>Aunt</strong></td>
<td>10</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td><strong>Uncle</strong></td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>9</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 7: Counts of ranking of “teachers” of local knowledge at home by girls

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother</strong></td>
<td>32</td>
<td>41</td>
<td>15</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td><strong>Father</strong></td>
<td>46</td>
<td>14</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sister</strong></td>
<td>20</td>
<td>29</td>
<td>23</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td><strong>Brother</strong></td>
<td>50</td>
<td>26</td>
<td>22</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Grandmother</strong></td>
<td>24</td>
<td>15</td>
<td>7</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td><strong>Grandfather</strong></td>
<td>19</td>
<td>10</td>
<td>7</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Aunt</strong></td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Uncle</strong></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 8: Counts of ranking of “teachers” of local knowledge at home by boys
When asked about certain duties that respondents perform at home, there were significant dependencies of the duties on the sex of the respondent. Crop husbandry activities of digging, planting, weeding and harvesting were practised by all the respondents, but amongst the respondents who reported that they did all four activities, about 52.6% were girls and 47.4% were boys which shows significant association on the sex of the respondent (Chi-square = 9.925; DF =2; P-value = 0.007). Participation in livestock herding was also highly associated with the sex of the respondent (Chi-square = 66.239; DF = 2; P-value = 0.000). Young boys usually do herding of livestock and girls may do so when there are no boys or they accompany boys to the pasture. Of all the respondents who reported familiarity with herding livestock in the pastures, about 44.6% were girls and 55.4% were boys. The gathering of edible herbs and fruits, fishing and hunting were also associated with the sex of the pupil. Of all the four activities related to supplementing the diet from natural resources, about 95.1% of the respondents reported that they participated in such activities. 70% of the girls participated in two or more activities related to gathering from the forest such things like food, fruits, vegetables, herbs, or fishing whilst 60.9% of the boys did these activities. When it came to hunting as one of the activities, more boys than girls took part in the hunting and gathering activities (Chi-square = 115.074; DF = 4; P-value = 0.000).

Knowledge about the local conservation committee (LCC) and its duties was independent of the sex of the pupil, but awareness of the rainmaking ceremony was dependent on the sex of the respondent. About 29.7% of the respondents were aware of the rainmaking ceremony of which 46.8% were girls and the awareness significantly depended on the sex of the pupil (Chi-square = 6.131;DF = 1; P-value = 0.013). When asked about the management of soil using local knowledge, there was a high dependence of this knowledge on whether the respondent was a girl or boy as shown by the low p-value of 0.001. The variation in the amount of knowledge about this between the two sexes is shown in table 9.

<table>
<thead>
<tr>
<th>Response</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two or more methods</td>
<td>42.7%</td>
<td>57.3%</td>
</tr>
<tr>
<td>Contours</td>
<td>49.5%</td>
<td>50.5%</td>
</tr>
<tr>
<td>Maintaining vegetation</td>
<td>57.3%</td>
<td>42.7%</td>
</tr>
<tr>
<td>Terraces</td>
<td>53.3%</td>
<td>46.7%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>67.7%</td>
<td>32.3%</td>
</tr>
</tbody>
</table>

Chi-square = 18.970; DF = 4; P-value = 0.001
Knowledge of trees that are not used for firewood was associated with the sex of the pupil (Chi-square = 10,309; DF = 2; P-value = 0,006). About 7% of the respondents could name at least two species of plants that were not used as firewood. From this class of respondents, 75% were girls and 25% were boys. The same percentage of boys and girls could name one type of tree not used for firewood. Some respondents reported that they know the trees, but have not been “told” the names. Still on forest knowledge, about 53,7% of the respondents that knew at least two indigenous types of trees that were used in carpentry were boys and equal percentages of boys and girls reported use of *Eucalyptus* trees. About 18,1% of the respondents could not name either an indigenous or exotic tree used in craftwork of which 64,4% were girls, but the overall association of this knowledge and the sex of the respondent was not very high (Chi-square = 61,053; DF = 9; P-value = 0,037). Almost equal proportions of boys and girls could name at least one trees species that harbours edible insects (about 50,5% girls and 49,5% boys), but of the respondents who could not name a single tree, 64,6% were girls which resulted in a high dependence of this knowledge on the sex of the pupil (Chi-square = 10,905; DF = 2; P-value= 0,004).

Knowledge about edible mushrooms was widespread amongst the respondents as 89,8% of them could name at least one edible mushroom of which 54,3% was girls. This knowledge significantly depended on whether the respondent was a boy or girl as shown by the probability value of 0,01. When asked about their interest in local knowledge 96% of the respondents expressed interest of which 53,8% were girls and this response was significantly depended on the sex of the respondent (Chi-square = 5,338; DF = 1; P-value= 0,021).

**5.1.3: Effect of Age**

*Objective 3: Investigate the influence of age on the transfer of local knowledge.*

Age is an important factor that affects the amount of local knowledge that a respondent possesses because it affects the amount of one’s exposure to certain types of knowledge and practices. As local knowledge is enhanced by experience, it is greatly affected by the age of the respondent. The analysis showed that almost all the responses were affected by the age of the respondent except for responses to four of the forty-one variables. The 10-14 years age groups were equated to the grades 4-7 although there were cases of children from disadvantaged homes that started school late and were older than their counterparts.
The age of the respondent did not affect participation in crop husbandry activities. Almost equal proportions of participants were observed. The independence was shown by the high p-value of 0.428. The respondent’s participation in livestock herding was independent of age but slightly higher proportions reported that they herded livestock in the lower grades than the upper grades as this task is considered to be an easy one, with older boys given other duties than herding livestock. About 64.1% of the respondents reported that they herded livestock of which 27.8% was in grade four; 26.8% in grade five; 23.8% in grade six and 21.6% in grade seven. The low association of this activity on age was shown by the probability value of 0.071.

About 29.7% of the respondents reported that they knew about the rainmaking ceremony. There was a gradation of this knowledge and its variation according to age as some respondents linked it to traditional practices, others to Christian practices whilst others only knew that local leaders were involved, but did not know what happened. Older respondents knew more about this ceremony than younger ones as shown in table 10.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage Aware</th>
<th>Percentage Not aware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 4</td>
<td>13.7</td>
<td>86.3</td>
</tr>
<tr>
<td>Grade 5</td>
<td>21.7</td>
<td>78.3</td>
</tr>
<tr>
<td>Grade 6</td>
<td>42.1</td>
<td>57.9</td>
</tr>
<tr>
<td>Grade 7</td>
<td>43.9</td>
<td>56.1</td>
</tr>
</tbody>
</table>

Chi-square = 45.107; DF = 3; P-value= 0.000
Table 11: A summary of the responses that were significantly dependent on the age of the respondent.

<table>
<thead>
<tr>
<th>Variable</th>
<th>P-value</th>
<th>Level of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in telling folk stories</td>
<td>0.005</td>
<td>++</td>
</tr>
<tr>
<td>Gathering of forest foods and herbs</td>
<td>0.001</td>
<td>++</td>
</tr>
<tr>
<td>Awareness of local conservation committee (LCC)</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know the role of LCC</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know about rainmaking ceremony</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Soil fertility maintaining methods</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Erosion control methods</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Ways of controlling a gully</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Reasons for controlling gully</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know about animal/birds related to evil things</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Aware of totem taboos</td>
<td>0.001</td>
<td>+++</td>
</tr>
<tr>
<td>Know the trees used as timber or poles</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know trees that are not used as firewood</td>
<td>0.005</td>
<td>++</td>
</tr>
<tr>
<td>Know craftwork trees</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know the poisonous fruits</td>
<td>0.004</td>
<td>++</td>
</tr>
<tr>
<td>Know snakebite medicinal plants</td>
<td>0.030</td>
<td>+</td>
</tr>
<tr>
<td>Know trees that harbour edible insects</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Aware of forest conservation strategies</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know edible mushrooms</td>
<td>0.012</td>
<td>+</td>
</tr>
<tr>
<td>Know the location of edible mushrooms</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know human medicinal plants</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know livestock medicinal plants</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know indigenous vegetables and fruits</td>
<td>0.006</td>
<td>+</td>
</tr>
<tr>
<td>Aware of the socio-cultural significance of trees</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Aware of the significance of mountain fires</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Know the birds that are linked to rainfall</td>
<td>0.003</td>
<td>++</td>
</tr>
<tr>
<td>Know about trapping edible insects</td>
<td>0.015</td>
<td>+</td>
</tr>
<tr>
<td>Perceptions of interest about local knowledge</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Think it worthwhile to pass knowledge to younger people</td>
<td>0.002</td>
<td>++</td>
</tr>
<tr>
<td>Ways of passing on the knowledge.</td>
<td>0.003</td>
<td>++</td>
</tr>
<tr>
<td>Perceptions on trend of changing local knowledge</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Causes of the changes</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>AIDS awareness</td>
<td>0.000</td>
<td>+++</td>
</tr>
<tr>
<td>Overall rank regarding local knowledge</td>
<td>0.000</td>
<td>+++</td>
</tr>
</tbody>
</table>

+ Weak association $0.005 \leq p \leq 0.05$
++ Intermediate association $0.001 \leq p \leq 0.005$
+++ Strong association $p = 0.000$
5.1.4: Effect of religious Affiliation

Objective 4: Investigate the influence of religious affiliation on local knowledge survival

Religion has a great impact on the survival of local knowledge in that some practices of local knowledge are believed to clash with Christianity. When Africans embraced western religion, they were led to believe that African religion was based on paganism and were encouraged to abandon some practices. Amongst the Christians, variable adoptions of this teaching were observed depending on the doctrine of the church. That is why religious affiliation was an important determinant to investigate.

Denomination did not affect many general issues related to local knowledge, but tended to affect some specific issues. A few general issues were associated with the church that the respondent belonged to like erosion control methods and reasons for controlling a gully, respondent’s knowledge of the birds that signify the coming of rains as well as the trees that harbour edible insects. The last one may be caused by the fact that some churches have regulations that forbid members from eating some insects although there appears to be no known explanations for the other occurrences.

Medicinal plants are used to cure various ailments of humans and animals. Some churches do not allow their members to use medicinal plants to cure human disease, but are not strict with livestock. The J. Marange sect is well known for this, the Apostolic churches and the new charismatic Pentecostal churches also forbid their followers to use medicinal plants. Amongst all the respondents, about 41,1% knew at least one medicinal plant for the human diseases that were being asked. There was a high association of this knowledge on the church to which the respondent belonged to as shown in table 12.

Table 12: Percentages showing dependence of knowledge about human medicinal plants on denomination

<table>
<thead>
<tr>
<th>Known Medicines</th>
<th>J. Marange</th>
<th>SDA</th>
<th>Catholic/Protestant</th>
<th>Pentecostal</th>
<th>Apostolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 5</td>
<td>9,1</td>
<td>36,4</td>
<td>45,5</td>
<td>0</td>
<td>9,1</td>
</tr>
<tr>
<td>3 to 5</td>
<td>11,5</td>
<td>31,1</td>
<td>24,6</td>
<td>13,1</td>
<td>19,7</td>
</tr>
<tr>
<td>1 to 2</td>
<td>8,1</td>
<td>35,7</td>
<td>26,0</td>
<td>10,2</td>
<td>20,0</td>
</tr>
<tr>
<td>None</td>
<td>24,3</td>
<td>15,4</td>
<td>26,2</td>
<td>18,4</td>
<td>15,7</td>
</tr>
</tbody>
</table>

Chi-square = 54,368; DF = 12; P-value = 0,000
The medicinal plants for diseases like diarrhoea, stomach problems, influenza and wounds were known by many respondents unlike those for kid’s colic, close child’s fontanelle and snakebites. The ginger plant, *Zingiber officinale* was commonly mentioned as a cure for stomach problems and even for kid’s colic. The other commonly mentioned medicinal plants are shown in table 13.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Medicinal plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
<td><em>Peltophorum africanum,</em></td>
</tr>
<tr>
<td>Wounds</td>
<td><em>Canthium huillense, Aloe spp</em></td>
</tr>
<tr>
<td>Stomach problems</td>
<td><em>Terminalia sericea, Pseudolachynostylis mapruleifolia</em></td>
</tr>
</tbody>
</table>

However denomination did not affect the respondent’s knowledge of livestock medicinal plants as shown by the very high p-value of 0.604. Livestock like cattle, goats and poultry when attacked by diseases are cured several plants like the Aloe plant “chikowa” or “gavakava”, which was reported by about 90% of the respondents as curing coccidiosis in chicken. *Bulbophyllum* species “batanai” was reported as a cure for broken legs in chicken. For cattle and goats, respondents reported the use of salty water mixed with other substances like washing powder (surf) and soot that forms on grass thatching, “chin’ai”, but specific tree species for big livestock were not easily named, as many of the respondents talked of dipping cattle and using chemicals.

### 5.1.5 Effect of school location

**Objective 5: Assess the effect of external influences on the survival of local knowledge.**

The location of an area is important in that it affects the activities and way of life that the residents are exposed to. In Marange communal area, children are sent to the nearest school such that pupils at one school where from the same villages. However, in neighbouring schools like Bemhiwa and Mt Makomwe respondents were drawn from some common villages. The same case was observed between Zedza School and Mt. Makomwe. Respondents from Nyachityu, Hama and Machedye villages where found in both Makomwe and Zedza as were respondents from Bemhiwa village found at Bemhiwa and Makomwe.
schools. The sample from each school covered a minimum of ten villages and Chikwariro
drew pupils from the greatest number of villages as it was far away from the other schools.

The responses to most of the questions were dependent on the location of the school. Those
that were not dependent on the location were awareness of the local conservation committee
(Chi-square = 5,685; DF = 3; P-value = 0,128). Respondents from the four schools had the
same levels of knowledge about the persons who led the rainmaking ceremony and what took
place during the ceremony (Chi-square = 12,562; DF = 6; P-value = 0,051). In Marange, there
is a belief that some birds and animals cause misfortunes or are a sign of bad omens if they
are seen. These are the owl, hyena, the “two-headed snake” “tsukukuviri”, squirrel and
jackals. Most the respondents were aware of this belief and named these animals and the
independence of this knowledge on the location of the school was shown by a high p-value
(Chi-square = 4,207; DF = 3; P-value = 0,240). Knowledge about the totem taboo was not
dependent on the location of the school as shown by figure 7. People believe that if one eats
the meat from the animal that symbolizes their totem, their teeth decay and fall off, or they
become sick or they will have misfortunes in life.

![Figure 7 Independence of totem taboos knowledge on the location of the school](image)

Figure 7 Independence of totem taboos knowledge on the location of the school
(Chi-square = 3,224; DF = 3; P-value = 0,358).
Knowledge about the trees that are not used for firewood was not dependent on school location (Chi-square = 5,483; DF = 6; P-value = 0,483) as were knowledge about wild poisonous fruits (Chi-square = 5,768; DF = 6; P-value = 0,450) and medicinal plants for treating snakebites (Chi-square = 3,822; DF = 6; P-value = 0,701). The respondents were all equally aware of the methods for capturing edible insects that did not depend on school location (Chi-square = 11,732; DF = 6; P-value = 0,068). The higher the p-value the greater is the independence of response on the location of the school. Responses on the perceptions on local knowledge regarding the transfer, interest in it and its survival were also independent of the location of the school. AIDS awareness was also not affected by school location as shown in table 14.

<table>
<thead>
<tr>
<th>School</th>
<th>Awareness</th>
<th>Not aware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bemhiwa</td>
<td>92,7%</td>
<td>7,3%</td>
</tr>
<tr>
<td>Chikwariro</td>
<td>90,6%</td>
<td>9,3%</td>
</tr>
<tr>
<td>Makomwe</td>
<td>89,4%</td>
<td>10,6%</td>
</tr>
<tr>
<td>Zedza</td>
<td>85,6%</td>
<td>14,4%</td>
</tr>
</tbody>
</table>

Chi-square = 3,967; DF = 3; P-value = 0,265

The responses that were affected by the location of the school were those that related to active participation of the respondent. One such activity was the collection of indigenous vegetables and fruits from the forests. The children usually do this as they herd livestock or go to collect firewood. There was a weak association of this knowledge on the location of the school as shown by the high probability value of 0,041 probably because of similar environmental features. Indigenous vegetables can be picked from fields, pasture or forests. Some of them can be dried and preserved for later use, as they are available on a short time basis during the rainy season. The vegetables that were commonly mentioned were *Datura stramonium* “chowa”, *Amaranthus spp* “mbowa”, *Bidens pilosa* “nhungumira”/black jack, *Cleome gynandra* “runi”/spiderflower, *Corchus spp*, derere and *Pouzolzia hypolenca* “teketera”. Many wild fruit trees were also named like *Strychnos innocua* “hwaka”, *Opuntia megacantha* “mudorofia”, *Vitex spp* “muhubva”, *Berchermia discolor* “munyi”, *Hexalobus monopetalus*, “mukwingiziri”; *Vangueria infausta*, “munzviru”; *Uapaca kirkiana*, “muzhanje”/wild loquat, *Azanza garkeana*, snot apple, “mutohwe”; *Syzygium cordatum*, water berry, “mukute” and many more types.
<table>
<thead>
<tr>
<th>Variable</th>
<th>P-value</th>
<th>Level of Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop husbandry activities</td>
<td>0,002</td>
<td>++</td>
</tr>
<tr>
<td>Livestock herding</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Folk stories</td>
<td>0,007</td>
<td>+</td>
</tr>
<tr>
<td>Gathering forest food, fruits and herbs</td>
<td>0,006</td>
<td>+</td>
</tr>
<tr>
<td>Role of LCC</td>
<td>0,045</td>
<td>+</td>
</tr>
<tr>
<td>Knowledge of rainmaking ceremony</td>
<td>0,027</td>
<td>+</td>
</tr>
<tr>
<td>Knowledge of soil fertility maintaining methods</td>
<td>0,030</td>
<td>+</td>
</tr>
<tr>
<td>Knowledge of traditional erosion control methods</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Control of a gully</td>
<td>0,006</td>
<td>+</td>
</tr>
<tr>
<td>The reasons for controlling the gully</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Trees used for timber or building material</td>
<td>0,028</td>
<td>+</td>
</tr>
<tr>
<td>Trees used for craftwork</td>
<td>0,017</td>
<td>+</td>
</tr>
<tr>
<td>Trees with edible fruits</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Trees harbouring edible insects</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Forest conservation strategies</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Knowledge of edible mushrooms</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Location of edible mushrooms</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Human medicinal plants</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Livestock medicinal plants</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Indigenous fruits and vegetables</td>
<td>0,041</td>
<td>+</td>
</tr>
<tr>
<td>Socio-cultural significance of trees</td>
<td>0,001</td>
<td>+</td>
</tr>
<tr>
<td>Significance of mountain fires</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Knowledge of birds associated with rains</td>
<td>0,011</td>
<td>+</td>
</tr>
<tr>
<td>Insects that come out after rains</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Perceptions of trend in changing local knowledge</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Causes of the changes</td>
<td>0,000</td>
<td>+++</td>
</tr>
<tr>
<td>Overall rank of respondent</td>
<td>0,000</td>
<td>+++</td>
</tr>
</tbody>
</table>

+    Weak association $0.005 \leq p \leq 0.05$
++   Intermediate association $0.001 \leq p \leq 0.005$
+++  Strong association $p = 0.000$
5.2 ADULT PERCEPTIONS

In an attempt to have greater understanding of the responses that the children were giving, interviews were done with some adults to assess their perceptions of local knowledge. This would help in linking the children’s responses to the home environments that they were growing in. Twelve households were visited and the characteristics of the respondents are shown in table16.

Table 16: General characteristics of the adult respondents

<table>
<thead>
<tr>
<th>Respondent no.</th>
<th>Sex</th>
<th>Age (years)</th>
<th>Denomination</th>
<th>Household composition</th>
<th>Years spent in Marange</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>49</td>
<td>Methodist</td>
<td>3 children, husband in town</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>79</td>
<td>Methodist</td>
<td>Wife, 1 grandchild, employees</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>49</td>
<td>Methodist</td>
<td>3 Daughter-in-laws and 3 grandchildren</td>
<td>29</td>
</tr>
<tr>
<td>4</td>
<td>Female</td>
<td>45</td>
<td>J.Marange</td>
<td>3 children</td>
<td>From birth</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>73</td>
<td>Methodist</td>
<td>Wife, son &amp; daughter-in-law, 4 grandchildren</td>
<td>57</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>72</td>
<td>Methodist</td>
<td>Husband, son and wife and 3 grandchildren</td>
<td>From birth</td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>33</td>
<td>Apostolic Faith</td>
<td>Husband, 2 children, relatives.</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>45</td>
<td>SDA</td>
<td>3 children, husband in town</td>
<td>Migrated when young</td>
</tr>
<tr>
<td>9</td>
<td>Male</td>
<td>28</td>
<td>AFM</td>
<td>Wife, grandmother, 2 chn.</td>
<td>From birth</td>
</tr>
<tr>
<td>10</td>
<td>Female</td>
<td>69</td>
<td>Mushakata</td>
<td>Husband, 2 daughter-in-laws, 2 grandchildren</td>
<td>44</td>
</tr>
<tr>
<td>11</td>
<td>Female</td>
<td>53</td>
<td>Methodist</td>
<td>Son and daughter-in-law</td>
<td>35</td>
</tr>
<tr>
<td>12</td>
<td>Female</td>
<td>33</td>
<td>SDA</td>
<td>1 child, sister-in-law, husband at work</td>
<td>12</td>
</tr>
</tbody>
</table>
The respondents who had not been born in Marange had moved into the area after marriage or their parents had migrated there when they were young. All the respondents were aware of the LCC and said that they learnt about management of natural resources as they grew up at their homes, but nowadays, teaching was done at school, workshops held by the Agricultural Technical and Extension Services (Agritex), and by NGOs like MDA. Four of the respondents reported that the local leaders called for meetings where regulations on the use of natural resources were given to the people. All the respondents said that the levels of local knowledge were decreasing due to cultural changes and they cited examples of how children long ago used to listen to elders, but nowadays youngsters derided old people's knowledge. Others felt that the elders of today do not know much about management of natural resources using local knowledge due to overpopulations of people and livestock which have resulted in deforestation. Six of the respondents, added that although people in the past had more local knowledge than at present, the young generation is also gaining a lot through education at school but differs in that it is not learnt through experience as in the past. They pointed out that children were participating in events like the National Tree Planting Day where knowledge about natural resources was enhanced and they were also exposed to talks and exhibitions from external organizations that visited schools.

All the respondents were aware of the rainmaking ceremony, but the responses varied when they were asked about what happens during the process. They agreed that the local traditional leader coordinated the event, but the other important participants varied from the spirit mediums to elderly women in the village to women of the “royal” family “madziashe”. One male respondent aged 79 said that long ago when people went to this ceremony in the mountains, they would not come back until the rains were falling, but things have changed nowadays. The youngest male respondent said that he had never attended the ceremony and only knew that the local traditional leaders conducted it. One woman aged 53, who came from Nyachityu village said,

“Our chief has been modernised and we have since stopped the practice in my village. We are now like whites in my village, but I have heard that chief Bemhiwa has already sent a message to his people to start preparing for the ceremony “musoso” which will take place soon.”
All the respondents said that they were aware of the taboos related to the maintenance of wells and springs. Eleven of the respondents said that a black container should never be used to fetch water, as the source would dry up. Other practices that were reported to cause the drying up of the source were washing clothes or dishes close to the water source. Drinking water directly from the source by mouth is believed to cause a snake to come out of the water. One woman aged 45 said that tampering with the springs or wells by covering them using cement, caused the drying of the water, and she gave an example of a well which the Ministry of Health Social Worker had protected for health reasons but had dried soon afterwards. She said that she had grown up fetching water from that place.

All the respondents could name at least two animals/birds that were a bad omen if they were seen. Responses were the same as for the children. The taboo related to not eating the meat from the animal symbolising one’s totem was viewed with high respect among the elderly people and one woman aged 72 said that her teeth had fallen off and some were rotting because she had cooked in a pot that had been used to prepare meat from the animal that symbolized her totem although she had not eaten it. When asked about the importance of this, two said it was for the animals’ conservation, three reported that it was to respect totems, three said the taboo had been there even before they were born but they did not know its significance whilst four of the respondents thought the taboo strengthens and maintains relationships amongst people. Food taboos were put in place long ago to reduce the chances of over-exploitation of the environment through over consumption.

When asked if they taught their children about management of natural resources at home, nine of the respondents said that they teach children at home and four of them reported that they usually talk about forest issues like the dangers of deforestation and encouraged children to plant and maintain trees and to practise selective cutting of firewood. Children were also taught about medicinal plants, but they easily forgot and the majority were not interested. Four of the respondents said that they were not teaching children as they thought that they learnt at school and did not have the time to do it. When asked whose responsibility it was to teach children at home, all the respondents felt that grandparents especially grandmothers should do this and parents too if they possess the knowledge.
When we were discussing the medicinal plants that were used to cure human and animal ailments, one of the male respondents of 73 could only name one tree species, *Canthium huillense* that he used to cure wounds in cattle. He said that he forgets these trees, but his wife and other women in the village were the experts on human ethno medicine. The other male respondent of 79 named human medicinal plants, but for the livestock, he could only name chemicals used like ESB₃, terramycin and rubbing honey to cure the goat’s skin disease. Most respondents could name traditional medicines for chicken and goats diseases and used pharmaceutical drugs for cattle diseases.

Five of the respondents said that they did not use medicinal plants and only resorted to them when clinical medication fails. Some were not using even the chemical medication because their church regulations were against use of any kind of medicine. Two women aged 69 and 72 pointed out that supernatural mechanisms assisted them in acquiring human ethno medicinal knowledge. They reported that they usually have dreams in which they are told about the cures for various diseases. One of these women freely shared this knowledge as she spoke of trees that are used to rid one of bad luck, cure blood pressure problems, birth control etc. The other respondent who is a popular specialist in human medicinal plants was secretive of her knowledge and even the husband warned her against exposing all her knowledge. This woman thus reported on the general things that many people had reported. The secretive attitude may be attributed to the fact that the woman may be earning some substantial income from the practice, as she was the one who advised women in pre-and post-natal childcare.

Both male and female respondents easily mentioned the names of indigenous vegetables and fruits. The older respondents reported that they prefer these vegetables to cabbage, rape and covo (*Brassica spp*), but the younger people thought the indigenous vegetables had a bitter taste. All the respondents said that they used to collect food and fruits from the forests and the practice had been fading, but was becoming popular again because of the harsh economic situation in the country. They said that they take children with them, but usually elders collected medicines unless they were common trees that children could be asked to take from forest or close to the homesteads. Some respondents pointed out some medicinal plants; usually herbs that they had kept at their homesteads and children also knew them. They all noted that the importance of natural resources to people as medicines and food had decreased because of westernisation, reduced knowledge base caused by fewer knowledgeable elders and the fact that the natural resource base has been severely depleted.
On being asked about the significance of mountain fires, all the elders said that they signified the coming of the rainy season. Some even mentioned that this was especially so with Nyaruhwe mountain which was the most sacred mountain in the area. The birds linked to the rains were named by all the respondents, but when it came to naming trees that were associated with some beliefs, variations were observed and the responses are shown in table 17.

Table 17: Adults’ knowledge of the socio-cultural importance of trees.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Know trees</th>
<th>Tree species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where traditional ceremonies took place</td>
<td>6</td>
<td>Parinari spp, Brachystegia spp,</td>
</tr>
<tr>
<td>Show presence of water</td>
<td>12</td>
<td>Syzigium spp, Ficus spp,</td>
</tr>
<tr>
<td>Not used for firewood</td>
<td>12</td>
<td>Maytenus spp, Lonchocarpus spp, Pseudolachnostylis mapruneifolia</td>
</tr>
<tr>
<td>Have poisonous fruits</td>
<td>5</td>
<td>Artabotrys spp, Pseudolachnostylis spp,</td>
</tr>
</tbody>
</table>

Some respondents said that some fruits that they thought were poisonous were eaten in some places, and it was difficult to name trees where traditional ceremonies were held, as they did not attend these ceremonies. Others reported that long ago fruit trees were not supposed to be used as firewood but people were increasingly doing nowadays because of limited choices. Others stated that they “knew” some of the trees that were being asked, but had forgotten the names.

All the respondents said that it was important to pass local knowledge about management of natural resources and socio-cultural beliefs to children, but some children were not interested. Some reported that children thought the knowledge from school was superior as they would always come home and tell them what they had learnt about management of natural resources from school. Three of the respondent’s thought that it was more effective to teach children at home through folk stories, from grandparents and practical teaching would be the most effective methods. All of the respondents felt that the levels of knowledge were decreasing because long ago people used to respect the sacred areas, but nowadays people have become immoral and some attributed this to HIV/AIDS and other related diseases. They said had affected many households in the community.
However, they also felt that perhaps time had come for people to go back to their old practices because of inevitable circumstances. In the same line they also felt that it might be too late to do that now since a lot of the practices have been forgotten over the years. The elders attributed the gradual decline in local knowledge and its importance to people to formal schooling, which promoted the rejection of “primitive” traditions by the young. Older respondents talked about how their grandmothers used to forbid them from pointing at the sun, moon or stars and sacred waterfalls saying that their fingers would remain pointing in that direction. This was a sign of respect for the natural world, which was believed to be the habitat for the spiritual world. Some elders spoke about Marange communal area as having once been covered with thick forests and plenty of game, which is not the case anymore.

There appeared to be a collective loss of memory with only three of the respondents really confident of their responses whilst the others had pieces of information, which they were not sure of. Adult respondents were at first incredulous and suspicious of outsiders’ interest in “primitive practices” and “poor people’s foods” and they would laugh when asked about the wild fruits. After an explanation, they were happy and even named some other medicinal plants for diseases that were not on the list they were being asked and they also talked more about what used to be.
6.1 Discussion of objectives

6.1.1: Objective 1: Effect of Family Structure

The impact of HIV/AIDS extends beyond those living with the virus, as each infection produces consequences, which affect the lives of the family, friends and communities surrounding an infected person (Lyons, 1998). Observations have shown that those most affected by the disease are children whose family structures are greatly altered. The forms that families take after parent(s) die from the disease vary within and across cultures and generations. They are affected by increasing urbanization, by poverty, by political and economic migration, by changes in labour market structures, by changing roles of women and other factors (Reid, 1993).

Observations show that when one parent dies of AIDS in a family the other parent who will be living with the disease also dies shortly leaving orphans (Ayieko, 1997). Orphans are usually taken by the extended family, which has been the most reliable safety net for them as respondents reported that they were staying with grandparents, aunts, uncles or other caring adults who frequently assume responsibilities that enable children to remain in their homes or take them to their own families (Lyons, 1998). The study shows that many orphans stay with grandparents more than the other relatives. Grandparents are thus the key caregivers for orphans in these rural villages (Ayieko, 1997 and Foster and Williamson, 2000).

However, frequent deaths seem to be weakening the extended family support system and threatening to separate household members as evidenced by the presence of child-headed households in the community. Although the number of these households was small during the study, it can be speculated that the numbers of child-headed households will slowly increase, as extended families no longer feel obliged to welcome orphans when they will not even be sure of the future of their own children. A previous study predicted that child headed households will become more and more frequent as the epidemic spreads (Ayieko, 1997). The prevailing situation in the country is likely to reduce the surviving members’ capacity to manage and support each other and the major victims of this incohesiveness are orphans.
(Ayieko, 1997). Given the growth of individualism and the nuclear family amongst villagers, many caregivers do not welcome the obligations that come with an extended family support system. Almost all the respondents who were staying with their parents were reporting that the family members consisted of their parent/s, brothers and sisters and rarely grandparents or other relatives. Some reported that grandparents stayed close to them but in separate houses and they would fetch water and do other errands for them, but they cooked separately and slept in separate houses. The concept of individualism is compounded by the fact that many households live in communities that are already disadvantaged by poverty, poor infrastructure and limited access to basic services (Foster and Williamson, 2000).

Respondents who were staying with grandparents and siblings showed signs of being disadvantaged economically as some of them were wearing torn uniforms and came to school barefooted. Their physical appearance showed that they were not well fed or they were socially unstable. The unexpected responsibility on grandparents to provide economic support for the children is hard to adjust to, as they themselves would have been depending on the children’s parents for financial assistance during their old age (Ayieko, 1997; Topouzis, 1998). The elderly often have to shift roles from dependents to main providers having to support not only themselves, but also a number of dependent grandchildren, often in conditions of poverty (Topouzis, 1998). The role of the elderly is changing from the conventional view that treats them, as a passive and largely inconsequential entity (Laquinta and Guerny, 1999), to one where they have become active caregivers. This may drain them physically leaving them without the time to teach the children about traditional methods of resource management as shown by the insignificant dependence of level of knowledge on the family structure from which the respondent came from. The heavy physical responsibilities do not affect the practice of telling folklore at night as shown by the prevalence of this practice amongst disadvantaged households. Elders had the responsibility of telling folk stories to children in the olden days. Narratives, told over and over again to children and adults alike, were another important mode of communicating local knowledge (Turner et al., 2000). These may be comforting stories to the grandchildren as folklore can be related to various issues like hunting, love, war and victory, farming etc.
Children in child-headed households had the same levels of local knowledge as those that are attached to elders possibly because their parents may have imparted this knowledge to older brothers and sisters that they were staying with before they died. However, dependence on the feasibility of this method of knowledge survival decreases when these household heads become younger and younger with increasing severity of HIV/AIDS. This can be helped if counselling of terminally ill parents would make them more likely to pass on crucial knowledge to their children at earlier stages (Ayieko, 1997; Egal and Valstar, 1999), but the Shona culture does not encourage one to prepare for their eventual death, since death stories is taboo. The knowledge of young people may have its greatest weakness in lacking enough practical experience, which is a cornerstone of local knowledge.

Orphans may have high levels of local knowledge because they are generally impacted upon even before they are actually orphans. Before parents’ deaths, children often shoulder new responsibilities which include domestic chores such as cooking, cleaning and fetching water, laundry, care giving activities, agricultural or income generating activities (Foster and Williamson, 2000). Thus these children learn to interact and subsist from the forest and other resources for the survival of the household so that their knowledge is not significantly below that of attached children as may have been expected. These children have increased workloads and assume decision-making duties that dramatically transform their roles within the household. The children who were not living with their parents knew more about trees that are not used for fuel, probably because of the increased workloads and duties. Children living with other relatives may have had the same reason for their high levels of local knowledge as previous studies have shown that it is common that children may be taken into households for ulterior motives and they become sources of free labour and can be treated like property or servants (Lyons, 1998). In this way, the children are exposed to various types of local knowledge. One of the impacts of orphanhood is an increase in the amount of work performed by children, sometimes as young as five (Rugalema, 1999), and the workload of orphans may be greater than non-orphans living in the same household (Foster and Williamson, 2000).

Many orphans quit school and jeopardise their own health and developmental needs to take on the roles as parent, nurse and mother. This may have contributed to the small numbers of respondents from these households at the schools. Children without parents were older than those with parents probably because they had to stop their studies for sometime and resume them later, or they are made to quit forever. Respondents in grade 4 were normally of ages 9
or 10, but some respondents aged 12 were observed. Although children in rural primary schools of Zimbabwe do not pay school fees, the costs of building fund may be unaffordable to these disadvantaged households. This was observed during the study when some pupils at Makomwe were sent away for not paying building fund on the day the survey was done. Discussions with teachers revealed that of the many school dropouts each year, the majority of them are from poor households. Studies from several countries confirm significantly less enrolment rates among orphans than non-orphans and identified risk factors such as girl orphans, children orphaned by AIDS, and rural or poor households (Foster and Williamson, 2000).

The non-significant dependence of local knowledge on the family structure and relationship to household head may also be attributed to community interactions. Community daily activities provide opportunities for exchanging local knowledge, for example, while attending livestock herding, markets, waiting in line at the well/borehole to fetch water, organising cooperative work parties for various husbandry practices or simply chatting at church meetings and village meetings, and other gathering places. In Marange area, young boys and sometimes girls meet in the communal grazing lands as they herd livestock, gather food and fruits and collect firewood. During these moments children may exchange information. These interactions sustain local knowledge as children try to impress each other with the pieces of information they would have learnt from elders. Unattached children may learn from community elders as elders emphasized the importance of a child’s interest in determining transfer of local knowledge. Elders in the community therefore teach interested youngsters even if they are not related to them. In Africa, transfer is not rigid, with instances of grandparents, uncles, in laws and even neighbours passing on their local knowledge to apt and interested younger male and female relatives and community members (ITDG, 1989).

However, this method of knowledge transfer runs the risk of being very general without articulation of the depth of explanatory knowledge. If the children come from child-headed households, then their knowledge will be weak as elders at home do not augment it and this thin knowledge base may be wiped out in the next generations. Amongst the older members, knowledge transfer may be through village meetings, meetings at the market and various reciprocations amongst villagers as they strive to sustain one another and look after the orphans and the poor amongst them (Makufa, 2001).
6.1.2: Objective 2: Influence of Gender

The study has shown that local knowledge was either transferred to all respondents regardless of the sex of the household head, but some forms of local knowledge depended on the sex of the household head. Women play an important role in the transfer of local knowledge judging by the ranking of the teachers of local knowledge by the respondents. Although girls ranked female elders more highly than males ones, boys ranked both males and mothers highly, which shows the important role of women as managers of and transmitters of local knowledge.

Women-headed households may have lacked cattle as men usually dominate ownership because children from these households participated less in livestock herding than the other respondents. This also reduced their access to organic ways of maintaining soil fertility, as manure from the cattle kraal is normally used. Anthill soil used to be a major source of organic nutrients, but is declining in usage because of resource depletion with increasing human population. Although they face these problems, women headed households have to depend mostly on organic methods of replenishing soil nutrients because it is a cheaper alternative to inorganic nutrients since they are usually disadvantaged economically. The growing number of households headed by females and the “feminization of agriculture” has placed greater burdens on the most vulnerable segment of society in developing countries – rural women (Future Harvest, 2001).

The migration of male family members has resulted in three categories of female-headed households, which have access to resources in different ways and this group is therefore not homogenous. These are:

- **de facto** female headed households where the husband has migrated for economic reasons and
- **de jure** female headed households where the head is either unmarried, divorced or widowed;
- periodically female headed households where male migration is seasonal or households which may be one of several units attached to an adult male through polygamous marriage (Mheen-Sluijen, 1996).
Women who are de facto household heads may be amongst the better families, for example those who are married can access larger areas of land, cattle, ploughs, due to the benefit of remittances and are able to hire labour (Mheen-Sluijen, 1996). These women also find themselves in decision-making positions, although they may still leave some decisions to the husband who is traditionally considered as the head of the household. These changes demonstrate that the boundaries of gendered knowledge are neither fixed nor independent (Cherfas, 2001b; Rocheleau, 1991).

Forest conservation strategies were known based on gender probably because men usually set the rules and regulations governing the use of forests. Men usually have more positions in the political and spiritual leadership and play a major role in decision-making (Haverkort and Hiemstra, 1999). This may explain why more respondents from male-headed households knew more on these strategies than those from female-headed ones. After the age of 8-10, the instructions of children within the household take place almost exclusively along gender lines as children begin to accompany their parents into the fields, boys with fathers and daughters with mothers (Cross and Baker, 1991). Men being the leaders traditionally, they constitute the conservation committee and pass the by-laws governing resource use and thus more boys than girls were aware of the LCC.

Respondents from male-headed households knew more about the methods of controlling soil erosion because previous studies in the communal areas of Zimbabwe have shown that men’s major farming activities involved digging trenches and building mounds for planting sweet potatoes and trellising of tomato plants (IFAD/FAO, 1998). These trenches constitute the contour ridges made in the fields to control soil erosion. The children possessed agricultural skills in general, because in most rural areas, both boys and girls as young as age 6 and above are encouraged to take part in agricultural production (Ayieko, 1997). Girls who normally have to collect firewood had more knowledge about the trees that should not be used as fuel. Overall, girls knew more than boys on the aspects of local knowledge related to household chores and crop husbandry activities, as they are usually women’s responsibilities. After land opening and/or ploughing, the men normally take a back seat and leave the rest of the production process to the women, although they will step in and help if there is special need (IFAD/FAO, 1998). However, specialized skills were learnt from special people like some respondents reported that they learnt to build and make carvings from wood from their fathers who were doing this on a commercial basis, or to make wire mesh, make metal products
especially amongst the boys who were members of J. Marange Church as the church members are well-known for this skill. Boys knew more about trees that are used in woodwork because men mostly do this job. The girls’ knowledge of these trees was from observing their fathers, uncles or brothers doing it, but boys reported that they had practical knowledge.

Women play a critical role in ensuring household food security (Mheen-Sluijen, 1996), as they are solely responsible for the field cultivated relish crops and those collected from the wild (Mutimba, 1996). Respondents from female-headed households knew more about the detailed location of mushrooms than those from male headed ones because they would participate with their mothers or female elders in doing this. They may have begun by accompanying them and when they could distinguish the edible mushrooms from the poisonous ones confidently then they would be sent to collect on their own. Men perform the task of catching the flying ants “ishwa”, at night by the nature of the timing of the exercise as women will be indoors and women are believed to be scared than men. Women will roast and dry the flying ants, which will be used as relish or a snack. Respondents from male-headed households knew more about the mass capture of these ants since they would participate with the male elders or watch them during the capture exercises.

Respondents from female-headed households were more aware of HIV/AIDS than those from male headed ones. This might be because women find it easier and are more comfortable discussing these issues with children than men. More respondents from male-headed households reported that they learnt about the disease from the media (radio and television) probably because the male household heads did not talk about HIV/AIDS at home, or the fact that these households can afford to have the radios and televisions in the home resulted in the household head not dwelling much on oral education. AIDS awareness amongst Zimbabweans is very high and efforts are centred on teachers as they would ripple effects on children and communities (The Herald, 2001) and radio and television programmes promote AIDS awareness.

Significant dependences may have been caused by the many duties that women usually perform at home. Women universally bear and nurse children and have the greater responsibility of caring for dependents than do men in all societies (Colfer, 1991; Kunkel, 1995). These responsibilities in the broad sense include being producers of labour, teachers of
children and caretakers of the young and the old. As girls associate more with the female elders, they also learn these tasks. Girls as young as nine assume heavy responsibilities of working in the garden, preparing and serving meals to both young and old siblings in the household (Ayieko, 1997) and girl respondents talked of the many duties they perform at home. The Shona culture also encourages girls to be hard workers and to learn all the “female” tasks in preparation for their own homes when they marry. Boys are not treated as strictly as the girls since care giving and “home-building” tasks are for women whilst men have to provide for the family financially. However, today’s women fulfil both tasks as they get educated and become gainfully employed.

Another broad explanation for the generally insignificant effect of gender is that although men and women’s priorities varied amongst the elders, they knew many of the same practices, socio-cultural beliefs and associations. They tended to talk about different tree species or in some cases different products and uses of the same species. Whereas men’s widely shared traditional knowledge was mostly developed in livestock activities, carpentry and other activities, their out migration, sedentarization and formal schooling have all militated against transmission of the gendered practices to the young since less than 10 boys reported learning specialized skills from their male elders. Men’s knowledge was also unevenly distributed as it decreased markedly among the younger males in the community. Among the women, there persisted a widely shared, high level of general knowledge about wild food, medicinal plants with an overall reduction in the scope and depth of proficiency in the younger females. However, the knowledge gap between generations was not nearly as pronounced as that for men.

6.1.3: Objective 3: Influence of Age

The old and young respondents had the same classes of information, but significant dependences were observed after probing. Although young respondents were aware of several aspects of local knowledge, their knowledge was based on theoretical understanding and not practical understanding. The younger respondents were aware of certain practices, but could not offer reasons to explain why things happened the way they did. The young respondents’ information was not whole, but came as pieces of information. For example, they knew that the local traditional leaders led the rainmaking ceremony, but did not know that the ceremony involved brewing of beer and appeasement of ancestors in shrines so that rain would fall.
Elders could easily explain practices such that a knowledge gap was observed between the old and younger people.

Formal education affected responses in that explanations given by the young respondents were based on things that they had learnt at school and not local knowledge. Explanations for not using a black container or soap around natural springs and wells were given based on hygiene and there was a mockery of local knowledge explanations. Local knowledge reasons articulate the presence of mermaids, fish-like spirit mediums that inhabit the waters, which can depart from the area resulting in the water source drying up, or the mermaids were said to take the offender which would scare children from inappropriate behaviour. Such reasoning resulted in fear and respect for the resource, but the new explanations may result in breaking the regulations if the offender is certain that he/she is not being observed. Even when respondents were being asked about the importance of the LCC, they began to explain the committee’s role in maintaining trees that are important in the water cycle, oxygen cycle and in photosynthesis. The way the respondents were relating this knowledge showed pride in the western knowledge that they had acquired. This phenomenon may result in young people regarding the knowledge they have gained from their elders as being inferior to the knowledge gained at school (Rajasekaran and Warren, 2000).

Most of the variables were significantly dependent on age because it determines the amount of exposure that the respondent had to the practice. Thus, there was a direct relationship between age and level of local knowledge possessed. Older respondents in a particular grade, for example, a 12 year old in grade 4 had more knowledge than his/her 9-10 year old counterparts. The variables that were not affected by age were those that appear like play rather than work to children such as livestock herding, crop husbandry and trapping flying insects by running after them. This is because as soon as a child can walk he/she is expected to help the adults in the daily tasks, work growing organically out of play (Crehan, 1992). Children’s participation in harvesting and management of traditional foods and materials is crucial as they gain practical experience through observation and assisting their elders, parents and grandparents (Turner et al., 2000).
6.1.4: Objective 4: Influence of Religious Affiliation

The study showed that membership to some churches can either promote or discourage the transfer and survival of local knowledge. In Marange area, it was found that not all aspects of local knowledge are viewed in the negative sense by churches. Gaining local knowledge in the areas of agriculture, resource management and food security were held in high esteem and were found to be independent of church membership. However, some churches discourage the use of human medicinal plants and acknowledgement of a spiritual world that was believed to be the supreme authority before God “Mwari”. Since time immemorial, people in the Zimbabwean society believed in the existence of a tripartite relationship of the human, the natural and the spiritual world and the respect and belief that mortal beings held towards the natural world as the habitat of the spiritual world and provider of foods, minerals and other resources, was itself a manifestation of conservation consciousness (Gonese, 1999).

The indigenous spiritual world was deliberately substituted by Christianity, which regards all sacred places and environments as the habitat of diabolical spirits (Gonese, 1999). This chaotic scenario washed away the value the environment used to have and conservation consciousness was eroded with it. Many of the older people were reminiscing about the days when they had been fewer people in the area, when they were thick forests, animals to hunt for meat, and food and fruits from the forests, which are not found nowadays. In those days according to the older respondents, disrespect of the sacred places or use of vulgar language would result in a person disappearing. Local knowledge practices were substituted for by Christian ones whereby rain would be asked for through prayers and water that had been prayed for and the “laying on of hands” was used to cure the sick by church leaders.

Churches like the Roman Catholic acknowledge the existence of ancestral spirits and allows its followers to consult their ancestral spirits sometimes. Studies have shown that in some churches, prayers for rain entered churches and people were not prevented from flocking to traditional shrines in times of trouble (Schoffellers, 1979). However, this two-tier system led to confusions and people began to forget some practices whilst churches like J. Marange and others just banned traditional practices. In contemporary contexts, the new Christian churches such as Apostolic Faith, J. Marange and SDA were much more aggressive about their opposition to “traditional” culture (Goebel, 1998). However, this study showed that the SDA appears promotes local knowledge teaching, AIDS awareness, management of natural
resources and use in maintaining health. Even the respondents from SDA reported many times of such lessons at the church and I have seen SDA television programmes that promote use of natural resource to promote health. Also respondents from Bemhiwa and Chikwariro, which are both SDA run schools, had the greatest awareness of AIDS, which indicates that the church promotes such teachings.

The respondents from J. Marange would barely allow the interviewer to finish asking about human medicinal plants, before they would quickly say that their church doctrine did not allow them to “touch” medicines. This was a strong indicator of the extent to which church membership has managed to suppress the survival of local knowledge in ethno medicine. However, some of them admitted that they have used traditional medicines secretly or have visited hospitals when the holy water was not healing them. This phenomenon points to the fact that there is no strict adherence to one form of religion, which may result in a loss of identity amongst the people and more so in future generations. Respect for either western or traditional forms of religion has decreased, as children would laugh at some practices, which they said were practiced by old people in the old times and yet do not know or understand everything about western culture.

6.1.5: Objective 5: Effect of School Location

Market development and socio-cultural contacts, introduce to rural communities new goals, beliefs and modes of communication, which alter the processes whereby local knowledge is produced and interpreted (Bebbington, 1991). The proximity to roads and other social services exposes people especially children to the influence of outside areas from schooling, from advertising propaganda and, above all, from the scientific rationalities that have supported the social dominance of modern groups and passed into orthodox conceptions of “developed” and “advanced” technology are all significant (Weismantel, 1988). The children were explaining local knowledge based on scientific reasoning of what they were learning at school. This shows the dynamic nature of local knowledge systems and their vulnerability to internal creativity, experimentation and external influences. They would repeatedly talk of the old ways done by the old people when they were expressing doubts about some socio-cultural beliefs, which shows the impact of external influences and formal education.
Respondents from Zedza and Makomwe schools where the villagers are actively involved in forest conservation and resource management with external organizations like the MDA were eloquently familiar with forest conservation strategies. The traditional leader in this area encourages people to have exotic tree plots at their homesteads and the forests are managed as a community project. They had lower levels of knowledge regarding edible mushrooms and their location probably because of the limited access to the resource by community regulations. The respondents also named fewer trees that cannot be used for firewood probably because they now turn to their eucalyptus plots for fuel. The widespread loss of specialized vocabulary (such as names of plants, animals and places and discourse associated with peoples) relationships to the land and various life forms is a major tragedy; yet the concepts are at least partially retained to the present day (Turner et al., 2000).

Motivation for adopting a new technology is as much ideological as it is economically or ecologically rational (Bebbington, 1991). In Nyachityu ward, the practice of brewing beer has been abandoned because it depletes the forest resources and men would spend a lot of money on beer (MDA, 2000). With this regulation, traditional practices like the rainmaking ceremony, which involves beer brewing, have been abandoned. Eucalyptuses that are grown in the family woodlots are favoured for their structure as good poles and extensive branching increases the amount of wood. The Rural Afforestation Programme in Zimbabwe was started with the aim of shifting people’s attention to the use of gum trees, as a means of saving the few remaining indigenous forests (Hanyani-Mlambo and Hebinck, 1996). The objective of the project was the growing of gum trees (Eucalyptus spp.) in order to provide communities with a source of fuel wood and poles for construction. The orchards that have been established are mainly of exotic fruits although indigenous fruit trees that were originally found in the fields or near homes have not been cut, but purposeful planting is for exotic fruit trees. These are grown for home consumption as well as for the market at the boarding school; clinic and business centre and the excess will be sold in the provincial town where they fetch better prices. Proximity to the tarmac road promotes these activities in comparison to Chikwariro area, which is not close to many social services and does not have a good road network. Market development has even resulted in people selling indigenous fruits like Strychnos spp., baobab fruit, Uapaca kirkiana and others, which were prohibited in the past. Some elders felt that such practices are the reason for some of the bad things that are happening in the country like prolonged drought spells, diseases and frequent deaths which they view as punishments from angry ancestral spirits.
Although the effect of school location was not expected to be very pronounced since all the schools where in a rural setting, and there is diffusion of information from one area to another especially for ubiquitous issues of resource management, but the observed results point to the greater effect of external influences. It can be postulated that with more “development” work and greater interaction with the outside organizations and urban communities, the remaining traces of local knowledge will be washed away. One 79-year-old male respondent pointed out the importance of using the mother tongue as it empowers people when he said, “When a young person goes to town for a few weeks, he/she will come back with a new language and act as if they do not know the rural practices. Even development workers come to address us in English and write their reports in English, but expect us to implement those projects.”

6.2 Changes in Local Knowledge

The study pointed to the “modern” ideas of causality and methods of evaluation that come over time which may:

- replace prior ideas and values.
- inspire a reinterpretation of prior ideas or
- be themselves incorporated into pre-existing systems of classification and explanation (Bebbington, 1991)

*Replacement* was observed in issues regarding market development. The processes of commodification evaluate technical practices in monetary terms and economic viability becomes more important in determining whether a practice remains or has to be replaced. In Marange area, people had replaced local knowledge practices of farming, ethno medicine and household food security with modern practices. Greater ethno medicinal knowledge for the smaller livestock like poultry and goats compared to that for cattle, may reflect the importance the community gives to various types of livestock. People may be willing to pay expensive drugs for their ailing cattle than for chicken and goats because smaller livestock have a lower ranking importance to the family and community.
Abandonment of the practice of brewing beer for rainmaking purposes because it depletes forest resources and wastes money is one example. Other examples are that mixed cultivation of “inferior” crops has been replaced with high yielding varieties and exotic fruits have replaced indigenous ones, chemical medication has replaced herbal medicines and western foods have replaced traditional diets. However, people are rediscovering trees and wild plants as sources of food, fodder and medicine (Mutimba, 1996) because of the increasing costs of inputs and modern technology. Other studies have shown that, the area under low external input agriculture (LEIA) is expanding as the rural population increases and external inputs become more expensive (De Boef, Berg and Haverkort, 1996). Many respondents complained of how difficult it is to cultivate crops nowadays because of the high cost of inputs, which are making them to switch back to LEIA. Others have experienced the unforeseen consequences of agricultural modernization (such as loss of crop biodiversity), resulting in renewed interest in local knowledge (Berkes, 1999b). One woman talked of how she had stopped going to western doctors repeatedly for her ulcers problem and was using an indigenous herb known in the area as the christmas tree. She had resorted to this because of the high consultation fees and costs of the drugs, and the herbal medicine worked better for her without side effects unlike the former. It appears as if people are rediscovering and rethinking their local knowledge, but are faced with the problem of resource depletion.

In others cases, rather than being replaced, local ideas are reinterpreted in the light of “modern” terms that have arrived with social-cultural change. For example, the yield decline that may have previously been described in anthropomorphic terms as the soil becoming tired and needing a rest was now explained as the effect of the soil lacking “nutrients” and requiring inputs of chemical fertilizers. The appearance of certain birds to signify changing seasons may be explained by the migratory behaviour of the birds and not “things” in the mountains. Whereas natural, but invisible or unknown agents such as winds, vapours were supposed to contaminate pastures, water sources and animal kraals resulting in disease, people were now explaining causes of diseases as results of “imbalances” in an organism’s body and germs. The drying of some springs and wetlands instead of being explained as caused by the anger of mermaids was now explained by some youngsters as being caused by monoculture and use of inorganic fertilisers and numerous chemicals that upset the balance of the ecosystem resulting in the alteration of the water table. In these ways, local science is reinterpreted in the introduced terms of modern science. Its theories, methods and cultural
significance all change as a result. This shows the constant review of any knowledge system is essential for further development (Mahale and Soree, 1999), as these systems are dynamic.

Incorporation is based on innovation and adaptation, which are keystone strategies to resource management. Knowledge production and reproduction constitute important components in the related processes of innovation and adaptation (Mahale and Soree, 1999). The incorporation of new farming technologies can be exemplified by the case of chemical fertilisers, which has resulted in the reinterpretation, yet on the other hand the practice of fertilisation is still considered in prior terms as an act of “feeding” the soil, rather than as a simple technical replacement of chemical deficiencies. Medicinal plants for human and livestock have been based on the use of a wide array of plant-and mineral-based ethno medicines, which serve as antiseptics. Respondents talked of cutting the infected part in a chicken that will be suffering from coccidiosis and wounds in cattle and covering them with ash or honey. From the viewpoint of western veterinary medicine, such procedures are effective. Cleaning, debriding and cauterising reduce bacteria counts and thus the danger of infections whilst dressing the wounds provides a mechanical barrier to the re-entry of bacteria (Mathias and McCorkle, 1996). Respondents also reported of force-feeding cattle from a soda bottle, which is essentially the same technique that is used worldwide to administer commercial livestock drugs in liquid form (Mathias and McCorkel, 1996). The use of local knowledge in an experimental way to learn from management interventions, with subsequent policy changes, makes it a potential tool for Adaptive Management3 (Berkes, 1999b).

In the light of the foregoing discussion, it is recognized that the factors that were being investigated interact to influence the survival of local knowledge, rather than simply one or the other. It has also been recognized that local knowledge practices and skills have their limitations and potentials. One major limitation is that the natural resources on which local knowledge is based are available on a seasonal basis or they have been severely depleted by increases in populations, intensification of land use, introduction of new cash crops and promotion of marketing infrastructure including roads and marketing institutions. Practical applications therefore tend to be highly reduced and in certain cases, impossible to implement.

3 encompasses the non-linear, multi-equilibrium concept of ecosystem processes and its emphasis is on uncertainty, resilience and feedback learning.
Despite these limitations, local knowledge has greater potential in local infrastructural and economic conditions. Many local knowledge practices are generally cheaper, more accessible and more readily understood. Sometimes, they are more environmentally friendly, often socio-culturally more acceptable and better adapted to local realities (McCorkel, 1995). Using cheaper alternatives increases food security, improves human nutrition, and empowerment of people to take greater control of their lives by virtue of their increased or more confident knowledge base, which will increase the incomes of villagers.
Chapter 7: Conclusion and Recommendations

7.1 Conclusion

“Knowledge is power”. The old expression is still true and has to be acknowledged for its wisdom, but the crucial question is, “Which knowledge or whose knowledge is power?” Today’s society has been dominated by Western culture and many people only recognize Western knowledge as power. But are rural people really without knowledge and technology? From a western standpoint, they are, as Western educated change agents have ignored local knowledge. However, this thesis and other numerous ethnographies and histories are continuing to show that application of local knowledge in ecosystem management ensures community sustainability and reproduction for generations.

The study showed that local knowledge understanding; practices and skills are built up over time from empirical observation, experimentation and innovation. Local knowledge and skills are not always evenly distributed within the community. Their distribution across and among different social, economic, gender and religions is influenced by several factors, which change peoples’ behaviour, roles and responsibilities over time. Women’s rights and responsibilities change with men’s out migration resulting in them acquiring and maintaining a broader range of new knowledge and skills than they had in the past.

The type of local knowledge involved affects its transfer and survival. Most people held the type of knowledge that is relatively simple and easily put into practice. Warren (1992b) also showed that the more complex and specialized the knowledge was, the fewer the individuals who were party to it Among the adults and younger respondents there was a generalised knowledge of for instance, the treatment of stomach problems which included diarrhoea, but only a few were able to link specific treatments to specific types of stomach problems.

The degree to which people rely on natural resources determines the degree of local knowledge possessed and their skills. In the areas where the interaction with the environment is less important than cultivation and marketing and other productive activities, such knowledge and skills are scarce and are of reduced quality. Respondents in the areas that were more vulnerable to external influences were adopting new practices learnt through diffusion
of information. As people pursue sustainable livelihoods, their coping strategies depend on traditional, local and innovative knowledge. The structures acting upon the community arise from both the government and private sectors in conjunction with processes that emanate from by-laws, price and conservation policies, institutions and cultural changes. People practising local knowledge practices and skills keep them alive. Practical applications help people to remember the detail, which enables them to transmit information more accurately and easily to others and it provides opportunities for demonstrating the practice to others. This strengthens the learning process. Although some people may not like sharing their knowledge, many people were eager and proud to discuss and demonstrate their knowledge.

The levels of local knowledge greatly depended on the division of labour and related task by gender, age or other biosocial parameters (McCorkel, 1994). In Marange area, it is often that the men and boys herd livestock in the pastures, cover gullies, cut firewood and constitute the conservation committee, whilst girls and women may herd livestock at home, collect firewood and perform other household chores. The social groups that involve themselves most frequently with certain duties and responsibilities had greater knowledge in those areas. However, with the changing family structures, this clear-cut division of labour is altered as people’s responsibilities and duties change within the family and community. Levels of local knowledge were also determined by occupational specialization. Respondents who were specialists in some skills or where closely related to them, were more knowledgeable in the areas of local knowledge related to the area of specialization. Women respondents who were specialized in medicinal plants could name plants that cure various diseases and how they should be obtained to ensure effectiveness.

Adult respondents emphasized that local knowledge was acquired, conserved and transferred across time and space through non-formal education and local communication networks that involved ceremonial and ritual events and mostly through application. This method of knowledge survival is now being influenced by people’s inaccessibility to some resources, abandoned ceremonies and rituals, collapsing social networks and the greater importance accorded formal education. The importance of community interactions in providing opportunities for exchanging local knowledge were noted although they may become ineffective with a reduced knowledge base in the future and weakening community relations. The growing dynamism of modern life calls for new forms of local knowledge transfer.
7.2 Recommendations

The study answered some questions and led to the formulation of others. There was a critical amount of local knowledge existing among the people, which can survive through various actions by the community, private and government sectors. A number of recommendations are being proposed that will ensure the survival of local knowledge and these are outlined as:

- Government policies and Agritex practices should promote the conservation and use of traditional foods, farming practices and medicinal use through closer interaction in developing concepts and technologies for rural communities. This may improve food security and human livelihoods. School curricula should have a close collaboration of formal knowledge and local knowledge systems.

- People should be encouraged to practise local knowledge as this leads to renewed respect among local people for their own culture and technological expertise. Use of local knowledge may benefit development by providing more realistic evaluations of local needs, environmental constraints and natural resource production systems.

- Collect and summarise findings from past work and promote information dissemination through posters, agricultural dramas and use of the media that communicate key messages about environmental protection and the importance of biodiversity, rangeland management and protection in Marange area. This knowledge should be systematically documented and reviewed with time.

- Protection of the environment should be linked to production, for example, promote medicinal plants value with potential for income generation. Afforestation and reforestation programmes should promote indigenous species.

- Selected remedies for livestock diseases should be verified in laboratories and on the animal species in question so that the community possesses proven and factual knowledge.

- Research and development workers should also recognise the importance of traditional vegetables, fruits and medicines and not just focus on imported crops and others with potential for high income. Local people’s decision-making practice is one area requiring further research. These practices determined the decisions that were followed and would be crucial in the design of development projects, extension programmes and livelihood coping strategies.
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Appendices

Appendix 1: Children Questionnaire

Date:
School name: Village name:
Respondent entry no: Sex: Age:

1.0 Household characteristics

1.1 Who makes up your household composition? Grandfather □ Grandmother □
Father □ Mother □
Brother □ Sister □
Other (specify)

1.2 Name the sex of the household head? ……………………………………………………………
1.3 What is your relationship to household head? ……………………………………………………

2.0 Natural Resources

2.1 Name the natural resources that you know? Soil □ Water □
Forest □ Wild animals □
Others:

2.3 Where do you learn about NRM issues? School □ Home □
2.4 If at home, who teaches you? Grandfather □ Grandmother □
(rank the teachers) Father □ Mother □
Brother □ Sister □
Uncle □ Aunts □
Other (specify)

2.5 How do you learn? **Crop husbandry:** digging □
Planting □
Weeding □
Harvesting □
**Livestock:** Herding in pastures □
Herding at home □
Fetching: Firewood □ Water □
**Stories:** Folkstories □
**Gathering:** Herbs □ Bushfood □
Fishing □ Hunting □
3.0 Local Conservation

3.1 Do you know about the local conservation committee (majengetavhu)?

3.2 If yes what is its role?

3.3 Is it important to have this committee? Why?

4.0 Water resources

4.1 What are the main sources of water in your community for?
   Drinking:
   Gardening:
   Livestock:

4.2 Do you know about the rainmaking ceremonies?

4.3 Who conducts the ceremony and what happens?

4.4 Name and explain taboos associated with wells or springs?

5.0 Soil conservation and management

5.1 Name any ways of improving soil fertility you know? Manure □ Inorganic fertilizer □
   Compost □ Leaf litter □ Anthills □ Other □

5.2 How is soil erosion controlled?
   Contours □ Planting trees □ Other □

5.3 How do you stop the expansion of a gully (donga)?

   b. Why is it necessary to stop the expansion?
6.0 Wildlife
6.1 Have you ever seen wild animals in this area? .........................................................
6.2 Name them:
Hare (tsuro) □ Duiker (Mhembwe) □
Wild pig (nguruve) □ Rock rabbit (mbira) □
Mhinga □ Kudu (nhoro) □
Any other:
6.3 Do you know of any animals/birds associated with evil or some strange happenings?……
b. Name them and what is believed to happen when you see them……………………………

6.4.1 What is your totem? ........................................................................................................
6.4.2 Do you know about the taboo related to eating meat from the animal that symbolizes
your totem? ..............................................................................................................................
6.4.3 What is the belief? ...........................................................................................................
6.5 Do you know or observe people following this taboo? ..................................................
..................................................................................................................................................
6.6 What is the role of this taboo? ............................................................................................

7.0 Forests
7.1 Name the trees that are used for the following purposes
Timber/poles: .........................................................................................................................
Not used for firewood: ..............................................................................................................
Craftwork (yokes, hoe/axe handles) .......................................................................................
Edible fruits: ............................................................................................................................
Poisonous Fruits: .....................................................................................................................
Treating snakebites: ..............................................................................................................
Harbouring edible insects (madora, mandere, harati): .........................................................
7.2 Are you aware of any forest conservation strategies in the community?
Afforestation □ Prohibitions □
Other:
7.3 Give the names of edible mushrooms and where they are found:
................................................................................................................................................
................................................................................................................................................
## 7.4 Medicinal Plants

Name the medicinal plants that cure these diseases;

<table>
<thead>
<tr>
<th>Ailment</th>
<th>Tree species used/ herb</th>
<th>Part of the tree used? (if bark how is it done)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Close child’s fontanelle</td>
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<tr>
<td>Kid’s colic</td>
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<td>Flu</td>
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<tr>
<td>Exorcise evil spirits</td>
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<tr>
<td>Dizziness</td>
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<tr>
<td>Buccal wounds</td>
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<tr>
<td>Preventive cure for babies</td>
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<tr>
<td>Diarrhoea</td>
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<tr>
<td>Toothache</td>
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</tbody>
</table>

### Livestock diseases?

<table>
<thead>
<tr>
<th>Livestock Type</th>
<th>Disease</th>
<th>Tree species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>Hatch all eggs</td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>Broken legs</td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>Coccidiosis</td>
<td></td>
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<tr>
<td>Goat</td>
<td>Gwembe</td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>Quarter evil</td>
<td></td>
</tr>
</tbody>
</table>
7.4 Wild food and fruits from forests or rangeland

<table>
<thead>
<tr>
<th>Name of fruit/indigenous vegetable</th>
<th>Location—where found (Forest/homestead)</th>
<th>Time of availability Month/season</th>
<th>Food Preparation (if known)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

7.6 Are you aware of the socio-cultural significance of these trees?
Mushakata?...............................................................
Mukute?........................................................................
Mupandapanda?............................................................
Munyamharadzi (rain tree)?...........................................
Others:........................................................................

8.0 Other Natural Resources and beliefs associated with them.
What do these changes or occurrences mean?
8.1 Mountain fires?........................................................
8.2 Name the birds linked to rainy days or beginning of rainy season?
Haya □ Masvoorera/madambira murove □
Madendera □ Others
8.3 What is the relationship between these insects and rain (cicadas, ishwa,
madziiranzeve/magurumbwe)?...........................................
8.6 How do you trap these insects?........................................
9.0 Perceptions of Respondent about Local Knowledge

9.1 Are you interested in learning more about local knowledge on NRM?………………

9.2 Do you think it is worthwhile to pass this knowledge to younger generations?……………

9.3.1 If yes, how can this be done?………………………………………………………………………

9.3.2 If no, why not?…………………………………………………………………………………………

9.4 Do you think there are changes in levels of local knowledge possessed by children in the past compared to the present?……………………………………………………………………………………………………

9.5 What do think are the causes of the changes in the importance of this knowledge?………

10.0 AIDS Awareness

10.1 Do you know about AIDS?………………………………………………………………………………

10.2 Where do you learn about it? School □ Home □ Media □

Other:

11.0 Ranking Respondent

10.1 Little □ Moderate □ High □

10.2 How come you possess such a level of knowledge about this subject (specific or all subtopics)?……………………………………………………………………………………………………

………………………………………………………………………………………………………………………

………………………………………………………………………………………………………………………

………………………………………………………………………………………………………………………

………………………………………………………………………………………………………………………
Appendix 2: Adult Perceptions of IK on NRM issues

Date:                                Village:                                
Entry no:                          Sex:                                        
Denomination:                Occupation:                                        

A. Background Information

1. Who do you stay with? Spouse: sibling: 
   Kin: other: 

2. For how long have you stayed in Marange area? ........................................

B. NRM

1. Do you know about the local conservation committee (majengetavhu)? .................

2. Where did/do you learn about NRM issues? ..........................................................

3. Have the levels of local knowledge of children in the past and present remained the same or changed? .................................................................

   b. Why are there changes like this? .................................................................

4a. Do you know about the rainmaking ceremonies? ..............................................

4b. Who conducts the ceremony and what happens? ..............................................

4c. Name and explain the taboos associated with wells or springs? ........................

5a. Do you know of any animals or birds associated with evil or some strange happenings? 

5b. Elaborate ........................................................................................................

6a. Are you aware of the taboo that forbids people from eating meat of their totem? ....

6b. What is the role of this taboo? ........................................................................

7a. Do you teach children local knowledge about NRM at home? ..........................

7b. What is your ranking of the local knowledge teachers at home? ........................
C. MEDICINAL PLANTS

Name the medicinal plants that are used to cure the following diseases.

<table>
<thead>
<tr>
<th>AILMENT</th>
<th>TREE SPECIES</th>
<th>PART USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach-ache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhoea</td>
<td></td>
<td></td>
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<tr>
<td>Wounds</td>
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<tr>
<td>Buccal wounds</td>
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<tr>
<td>Close child’s fontanelle</td>
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<tr>
<td>Kid’s colic (kumonyoroka)</td>
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<td></td>
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<tr>
<td>Exorcise evil spirits</td>
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<tr>
<td>Toothache</td>
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<tr>
<td>Snakebites</td>
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</tbody>
</table>

2. Livestock Diseases

<table>
<thead>
<tr>
<th>Livestock type</th>
<th>Disease</th>
<th>Tree species</th>
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</thead>
<tbody>
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<td>Cattle</td>
<td>Quarter evil</td>
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</table>

Name some indigenous vegetables and fruits you know

<table>
<thead>
<tr>
<th>Name fruit indigenous vegetable</th>
<th>Location (forest/home)</th>
<th>Time of availability (month/season)</th>
<th>Food preparation</th>
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3. Do you use NR often as medicines? .................................................................
   As food? ..................................................................................................................

4. Do you take anyone with you to the forest/fields? ...........................................

5. Has the importance of NR to people changed over time? .....................................
   As medicines? ..........................................................................................................
   As food? ..................................................................................................................

6. What are the causes for the changes if there are any? ........................................
D. Significance of these occurrences

1. What do mountain fires signify?.................................................................

2. Name the birds that are linked to rainy days or beginning of rains?......................
3. What do these insects signify in relation to seasonal changes?
   Cicads(nyenze) Ishwa

4. Name the trees commonly associated with the following:

<table>
<thead>
<tr>
<th>Tree species</th>
<th>Traditional ceremonies</th>
<th>Water presence</th>
<th>Not used for firewood</th>
</tr>
</thead>
</table>

5. Can you name trees whose fruits are poisonous?...........................................

E. PERCEPTIONS

1. Do you think it is worthwhile to teach local knowledge to the present generation?....

2. Are the children interested in learning such things?........................................

3. If yes how can this be done effectively?............................................................
   b. If no, why not?..................................................................................................

4. Do you think there are changes in the levels of knowledge possessed by today’s parents compared to parents of the past?.................................................................

5. What is the trend in changes?.............................................................................