THE ROLE OF NON-TIMBER FOREST PRODUCTS IN THE ENHANCEMENT OF RURAL LIVELIHOODS.A CASE OF NYAUTONGI WOODLAND MANAGEMENT PROJECT, CHIRUMANZU DISTRICTWARD 8.

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The undersigned certify that they have read and recommended to the Midlands State University for acceptance as a dissertation entitled: the role of non-timber forest products in the enhancement of rural livelihoods. A case of Nyautongi woodland management project in ward 8 of Chirumanzu District

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DEDICATIONS

This work is dedicated to my mother, Mrs VFalayi for the guidance and love she has given me. To my family, especially Ms SukoluhleFalayi and Dr Thabo Falayi without your financial support and words of encouragement this work would have been impossible. I'm particularly indebted to Mr M Phiri Project Coordinator of Forests Forces project under Food and Agriculture Organization of the United Nations (FAO) for giving me direction as well as encouragement.

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Acts 35 vs. 5 ….In Him we live, and in Him we have our being"

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ACRONYMS

CIFOR	-Centre for International Forest Research
EMA	-Environmental Management Agency
FCO	-Forestry Commission Officer
FSC	-Forest Stewardship Council
FAO	-Food and Agriculture Organisation
NTFPs	-Non-Timber Forest Products
RDC	-Rural District Council
WHO	-World Health organization

ABSTRACT

The extensive use of biological products from forests has become common in providing critical sources of medicine, food, and fodder and cash income, making dry forests the largest natural supermarket for millions of people in sub Saharan Africa. The study examined the role of Non-Timber Forest Products in the enhancement of rural livelihoods in ward 8 of Chirumanzu District. The study identified and evaluated the role of NTFPs using quantitave and qualitative approaches. Data was acquired through the use of questionnaires, interviews, observations and secondary sources of data. The researcher then used Statistical Package for Social Sciences (SPSS) to evaluate data. The study results confirmed that the households harvested four categories of NTFPs that include foods, medicinal plants, leafy vegetables and construction materials. Biological products harvested played a pivotal role in the enhancement of rural livelihoods by providing sustainable diets, ethno pharmaceutical uses and ethno veterinary uses. Ethno pharmaceutical uses included the utilisation of*Aloe Vera* (***Zumbani***) as a mosquito repellent and *Ximenia* (***mutsvanzvabere***)is used for treating livestock ringworms. The researcher observed that each household harvested an average yield of 300kgs of *VitexPayos****(tsvubvu***), 500kgs of ***Miombo leaf litter(murakwani***) and 400 kgs of thatch grass. Commercialization of NTFPs also enhanced household incomes of US$545 per season which was above the poverty datum line of a family of 5. The researcher found out that the indigenous fruits provided more nutritional benefits than exotic fruits and are important in poverty alleviation for example Strychinosspinosa (***matamba***) has a K content of 1370d whilst most exotic fruits like oranges have a *Kcal* content of 400d. This proves that some indigenous fruit trees are more nutritional than exotic trees.The respondents are highly dependent on Miombo leafy litter because of limited access to inorganic fertiliser.This study recommends that Chirumanzu Rural District Council (RDC) should maintain and upgrade the communication infrastructure to enhance NTFPs market base through accessible road networks.Overally, the research findings concluded that NTFPs are pivotal for the enhancement of rural livelihoods.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the study

The development of agriculture focusing on exotic crops particularly maize and wheat has resulted in the massive clearance of land and indigenous forests in Sub-Saharan Africa. Most governments in Sub-Saharan Africa especially Malawi and Zimbabwe have put the agricultural sector on top of their priorities list to enhance food security. However, the agricultural sector as a reliable source of livelihood has been negatively affected by poverty due to high prices of agricultural inputs and this has affected food security for most rural households. FAO (2012) supports this view as it indicated that maize yields averaged 800kg/ha in the early 1980's and in the period of 2000-2011 the average yield was around 400kg/ha. In rural Zimbabwe, most communities have turned to NTFP's as an alternative source of livelihood during periods of agricultural crop failures. It is also estimated that some 320 million people in Africa depend on dry forests and woodlands to meet most of their basic needs (Petheram et al, 2006).

Commercial Timber trade is a vital part of sustainable economic development. The exploitation of African forests has enabled the development of forest-based enterprises as a result creating employment for the rural poor through the commercialisation of both exotic and indigenous forest products. The growing pressures on commercial timber extraction have aggravated illegal logging thus severely damaging biodiversity (Word Bank 2004). At a global scale illegal logging costs governments US$10 billion per year (Word Bank 2004). This pressure has adversely affected biological products that are traditionally used at household levels for medicinal and subsistence use. Hence, this has led to the growing realisation of the value of Non Timber Forest products at household levels.

In, Brazil, (South America) the acknowledgement of NTFPs has led to the special administration and monitoring of NTFP's to safeguard the long term sustainability of species and to lessen adverse social and ecological impacts. This approach has led to the creation of the Brazilian Forest Stewardship Council (BFSC) whose mandate is for the certification of NTFPs management systems. Smart Wood (Brazil) (2002) articulates that the management systems through Eco-labelling have led to sustainable management of NTFPs on a commercial scale and the certification system has increased trade of biological products

tovast European Union (EU) and Asian markets. Johnson *etal* (2001) is of the view that this certification system has improved the trade of forest products within the Southern American region. This involves the commercialisation of biological products such as *Acai* (***Euterpeprecatoria)*** and *Jarina****(Phythelephas spp.)*** which are commonly used as aromatics and ornamentals. *Acai****(Euterpe precatory)*** and *Jarina****(Phythelephas sp.)*** are mostly collected by females and children then commercialised to mega companies that export them to Asian and European markets. These products are popular in European and Asian markets because there are widely used as aromatics and ornamentals.

Surprisingly not much is said about the extensive use of biological products from forests. De Beers and McDermott (1989) streamlined the term NTFP's in an effort to raise awareness of the significance of forests for subsistence use other than profitable logging. Non Timber Forest Products are harvested for both commercial and subsistence use, either regularly or as a fall-back during times of need (Chidumayo and Gumbo 2010). Therefore the idea of NTFPs has become an economically conventional ecological option of development.

In Bangladesh, contribution of NTFPs such as *Bamboo (****Melocannabaccifera****,) and Patipata (****Tenogynedichotoma***) amounts to USD $18, 7 million annually to the economy and provides employment of nearly 300 000 people (Basit, 1995). In light of such evidence it is clear that NTFPs are an important sector in reducing the rate of unemployment for the uneducated rural poor. This has led to the persistent use of NTFPs as a livelihood. Rather than only enhancing the Bangladeshi Gross Domestic Products (GDP) through exports of the NTFPs, wild potatoes and bamboo shoots have potentially decreased micronutrient deficiency amongst vulnerable children aged 0-6 years and has provided social and cultural benefits of traditional food systems (Chidumayo and Gumbo 2010). In light of such evidence it is also important to note that NTFP harvests produce fewer negative impacts on ecosystems than commercial timber harvesting. They enhance carbon sequestration, watershed and soil conservation functions in selected forest systems. Despite all these benefits little attention has been put forward by the Bangladeshi government to produce a comprehensive legislation that enhances and protects rural livelihoods through NTFPs harvesting.

*Shea butter (****Butyrospermumparkii)*** is the third most important crop in Burkina Faso and provides income to about 300 000 - 400 000 women per year (Schreckenberg, 2004). In particular, these products have shown to be essential for women and children, both extremely vulnerable groups (Chidumayo and Gumbo 2010). The level of dependence is seemingly high

especially to vulnerable groups because *Shea butter (**Butyrospermumparkii)*** is easy to collect and process. This is evident as female-headed and child-headed households have increasingly influenced the use of financial resources from NTFPs, for instance by engaging in cross border trade of wooden products and the selling of forestry products. Due to cultural limitations and personal security concerns, women can only access close-by forestry resources due to potential danger. Such limitations hinder the enhancement of rural livelihoods to female headed households.

Cavendish (2000) and Campbell et al (2002) are of the view that in Zimbabwe, approximately up to a one third of rural household income has been estimated to come from NTFPs, with the proportion higher in poorer households. Poverty challenges in Zimbabwe have worsened the Human Development Index (HDI) and the food and nutrition security situation. In light of such evidence Zimbabwe is, therefore, unlikely to achieve Millennium Development Goal 1 on halving hunger and extreme poverty by the year 2015. In Chivi District 15% of the non-timber forest products such as *Uapacakirkiana (**mushuku**),* *Parinaricuratellifolia(**muhacha**)* and *Strychnosspinosa (**mutamba**)* contribute to the household income and the household's value per year is US$99 per season.(McGregor 1995).Moreso it is clear that NTFP's help bridge seasonal gaps in income and food for many rural households, and thus they provide a safety net during intolerable and stressing seasons of low crop yields. These products contribute substantially to the food supply of rural populations and are more accessible to them. These products have a potential in improving food security and health system's. In recent years the level of dependence on NTFPs has relatively increased due to weak micro economic system prevailing in Zimbabwe.

In Masvingo Province, the use of *Brachystegia* woodland leaf litter ***murakwani*** is known to be beneficial for soil fertility improvement (McGregor 1995). This has helped farmers who lack access to inorganic fertiliser. The level of dependence is seemingly high due to sky rocketing prizes of the inorganic fertiliser. Moreso it is important to note that the level of dependence is increasing due to the notion of conservation agriculture. This has resulted in the extensive collection of leaf litter. Despite the extensive use of leaf litter as an alternative source to organic fertilizer, there is a general lack of understanding on the levels of dependence on Miombo leaf litter (***murakwani***).

The widespread utilization of NTFP, including the mopane worm in sub-Saharan Africa, has been confirmed by several studies (Cavendish, 1997).The mopane worm mostly occurs in the

mopane woodland such as Plumtree and Mangwe Districts. Stack et al (2003) indicates that the utilisation of mopane worms in these areas is significantly high due to low rain fed agricultural activities. Mopane worms also contribute household's cash income. However much attention has been paid on the commercialisation of mopane worm and little research has been done to indicate the actual household income. Gondo and Frost (2002) noted that mopane worms are used in supplementing seasonal shortages in cash or food (the mopane worm outbreaks in December/January occur at a time when rural families are short of both food and cash). The importance of Non Timber Forest Products for rural livelihood enhancement does not receive significant attention by policy-makers in Zimbabwe. Little knowledge is available on the levels of dependence and utilisation of NTFP's as a source of reliable livelihood. So the missing information is critical for the enhancement of rural livelihoods in Zimbabwe.

This study seeks to explore the uses and the levels of dependence on NTFPs in Zimbabwe focusing on Nyautongi Village in Chirumanzu District.

1.2 Statement of the problem

Most households in rural Zimbabwe depend on rain-fed agriculture as an alternative source of livelihood. Apparently rain fed agricultural activities has been affected by climate variability affecting crop yield negatively. During such times of household shocks and stress, rural communities result in coping strategies that involve the collection and utilisation of biological foods from forests as a safety net. NTFPs play a vital role in supporting household formal food systems. In this regard, most households in rural Zimbabwe have turned to NTFP's as a significant source of livelihood. This has resulted in the extensive utilisation and unsustainable use of edible plant and insect wild foods that range from *ParinuriCuraellifolia* (***Muhacha***), *UapacaKirkiana* (***Mazhanje***), *VitexPayos* (***Mukubvu***),*Bercheniadiscolour* (***munyii***), honey and fibres used for construction. This extensive use has the potential to curb food insecurity, alleviating dietary deficiencies. Chidumayo and Gumbo (2010) states that NTFP's have a greater potential in mitigating some of the devastating impacts of HIV/AIDS because NTFP's provide nutritional requirements for people living with HIV/AIDS. However, little research has been conducted to evaluate the level of contribution and effectiveness of NTFPs to food security, nutrition, and health of rural communities in Zimbabwe. Despite these potentials provided by NTFP's there is a lack of understanding

onthe levels of contribution to rural livelihoods .Apparently, the role of NTFPs in assisting the communities to adapt to the effects of climate variability is not well known and documented thus making the research gap critical .Unsustainable harvesting practices that sometimes culminate in the destruction of indigenous fruit trees reveal lack of valuing the potential contribution of NTFP's. This study seeks to explore the levels and uses of NTFPs in Zimbabwe focusing on Nyautongi village in Chirumanzu.

1.3 Objectives

1.3.1 General Objectives

- To evaluate the contribution of NTFPs to the livelihoods of communities at Nyautongi village in Chirumanzu district.

1.3.2 Specific Objectives

- To identify various NTFP's harvested in Nyautongi village
- To determine the quantity of NTFP's used at household level.
- To determine nutritional and medicinal purpose and other uses of NTFP's
- To determine levels of dependence on NTFP's.

1.4 Justification.

The research seeks to help guide Nyautongi Resource Committee in formulating by-laws that will enhance the sustainable management of the woodland regarding access to resources. Moreso the results will help the Government of Zimbabwe in creating forest based jobs through the commercialisation of NTFP's.

Non-Governmental organisations will benefit from this research because the results acquired from this study will provide information for rural economic development that can potentially result from NTFP's trade. This research will enable the development of clear marketing strategies of NTFPs. The findings of this study will be essential to government rural extension services in crafting pro-poor programmes that will address critical issues affecting the harvesting and utilisation of NTFPs at household level. The research findings will be fundamental in encouraging sustainable forest management. This research will help rural extension services in formulating policies and management practices that are effective in sustainable forestry management.

Moreso the findings of this study will be helpful to other countries or regions in the Dry Forests and Woodlands of Africa that have the similar biophysical, social and economic

characteristics that are similar to Nyautongi Woodlands. In synopsis this research will help resource administrators to make cohesive and sustainable resource management decisions for forest dependent communities for the enhancement of rural livelihoods

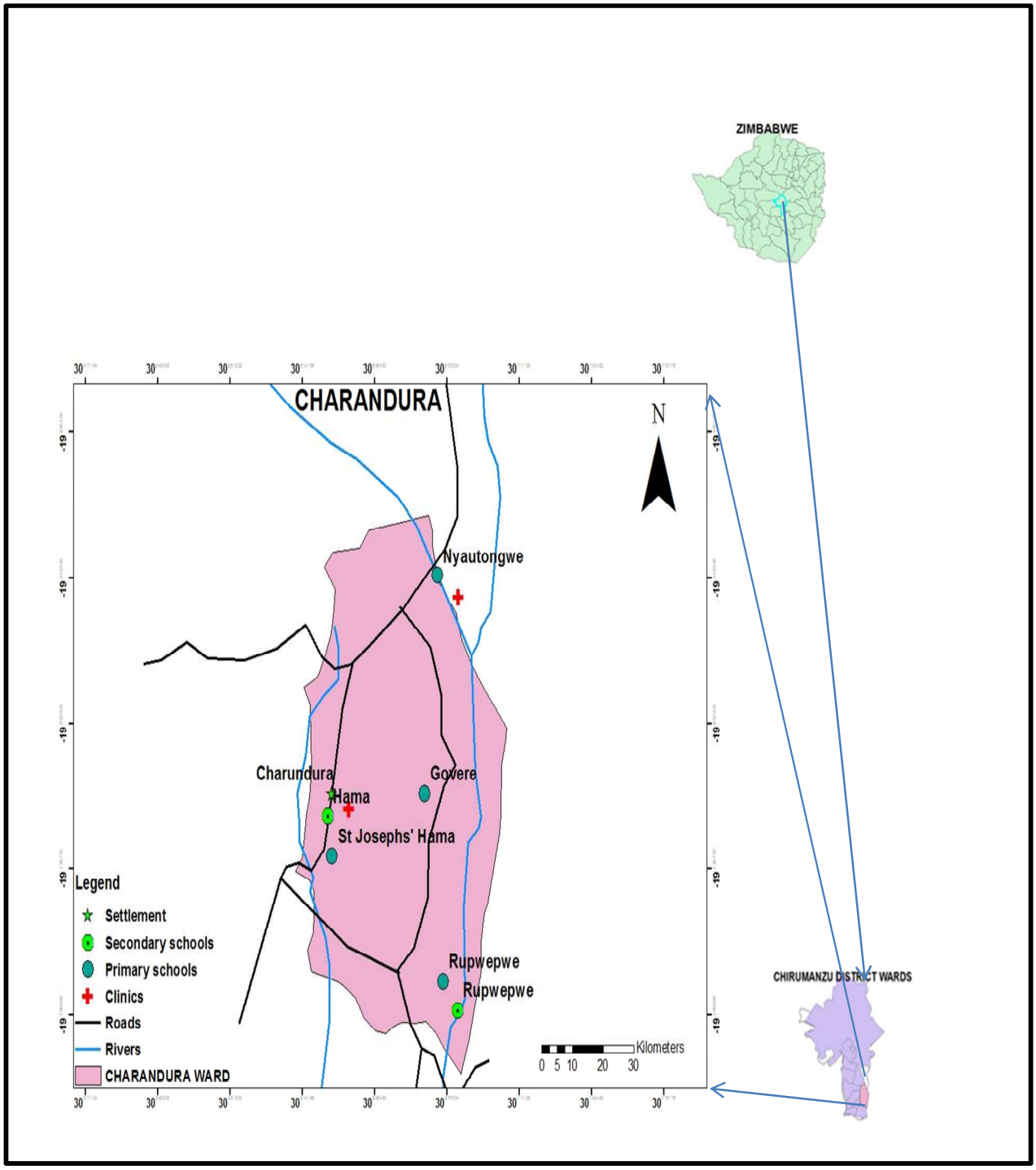

Fig 1.1 A map of ward 8 of Chirumanzu District

1.5.1 Physical characteristics

The study area is centred in Charandura Ward 8 of Chirumanzu District, Midlands Province. Vincent and Thomas (1960) classified Chirumanzu District in agro ecological region III but due to climate variability, Mugandani*e tal* (2012) classified Chirumanzu District under agro ecological region IV. Its coordinates are 19°25'0" N and 30°34'60" E in DMS (Degrees Minutes Seconds) or -19.4167 and 30.5833 (in decimal degrees). Its UTM position is TD45 and its Joint Operation Graphics reference is SE36-13. Chirumanzu is situated at an elevation of 4 747 feet above sea level.

The area has a temperature range of 19-26ºC and the district experiences a mean annual rainfall of 700mm. According to the Köppen climate classification Nyautongi woodland is classified as CWA woodland (Mild with dry winter and hot summer). The rainfall pattern is typically well-defined with a rainy season and dry season. The rain season commences in the second half of November and lasts for four months that is until the end of March. The main rains are due to the Inter-Tropical Convergence Zone (ITCZ).

The district has a profusion of distinctive granite landforms and regosol soils are mainly dominant in the area. Nyautongi is characterized mainly by sandy and clay soils with some very few portions covered with loam soils and this requires large amounts of fertilizers to boost production. The inhabitants of this area survive mainly through the cultivation of crops such as maize, groundnuts and rapoko.

The woodland is dominated by Brachystegia, Julbernardia and Isoberlinia making it Miombo Woodland. This has resulted in the availability of NTFP's such as *ParinuriCuraellifolia* ***(muhacha)****, UapacaKirkiana* ***(mushuku)*** and*Strychinoscourteti* ***(mutamba)*** which are basically used for household food requirements. The woodland also provides traditional medicinal plants to the locals such as *Gloriosasurperba* ***(kajongwe)*** and*Alloe Vera* ***(gavakava)*** used at household levels

1.5.2 Socio-Economic Characteristics

Chirumanzu District has an estimated population of 81 087 and Ward 25 has a total population of 3 331 (ZimStat, 2012). The project comprises 12 villages that have about 250 households each and a population of 1 250. The beneficiaries include men, women and children. A small business centre services this community, while a major road from Hama Mission to Chaka communal lands passes through the project area. The conservation initiative by the Nyautongi conservation group is to create awareness, conservation, and earth

healing which will enhance the restoration of bio-diversity for the provision of woodland produce like firewood, herbs, grass, fodder, fruits, poles, mushrooms, leaf-litter and a habitat for wild animals and birds.

The project is a community based conservation initiative and the size of the woodland is approximately about 20km^2. In early 1990s people from Charandura Growth Point and the adjacent Nyamandi communal lands degraded the Woodland through cutting down trees and grass for sale and household use. These activities gave way to loss of trees and opened the land to immense erosion. The Nyautongi community through its own initiative started to conserve and rehabilitate the woodlands which have cultural heritage dating back to the 1880s raids of the Ndebele king Lobengulas through tree conservation and bio-diversity conservation initiatives. This led to the formation of the project that would sustain their livelihoods derived from the conservation of the woodland,

Since the economic meltdown of 2007-08 the community has encountered high levels of food insecurity that are attributed to various factors including adverse weather conditions, the unavailability, high costs of inputs such as seed and fertilizers, and a weakened social protection systems that has resulted in the large proportional population of Chirumanzu District in Zimbabwe to rely on food aid from seemingly unreliable Non-Governmental Organisations (NGO). So Nyautongi woodland has become an alternative source of livelihood through the harvesting of Non timber forest products.

CHAPTER TWO: REVIEW OF RELATED LITERATURE.

2.1 INTRODUCTION

This Chapter examines literature related to the enhancement of rural livelihoods through the household utilisation of Non-Timber Forest Products (NTFP'S). Arnold and Pérez (1998) noted that, the past decade has witnessed a rapid growth of interest in non-timber forest products (NTFPs) among conservation and development organisations. The reasons being that, NTFP's enhance bio-diversity conservation and also play a pivotal role in poverty reduction.Saxen (2003); Arnold and Pérez (1998) supports this view as he articulates that NTFP's play an extensive role in enhancing rural livelihoods. Furthermore, these biological products from the wild can be harvested with relatively little impact on the forest environment (FAO 2008). These factors led to the introduction of the Non Timber-Forest Products Programme by the Food and Agricultural Organisation (FAO) in 1992.

2.1.2 DEFINITION OF NON TIMBER FOREST PRODUCTS

Despite the importance of NTFPs at both household and national levels, a number of basic definition and theoretical issues persist unanswered globally. Firstly there has been different schools of thought pertaining to the correct terminology of NTFPs and this has brought about many different semantics from various regions of the world.

De Beer and McDermott (1989) postulate that the term Non Timber Forest Products (NTFPs) encompasses all biological materials other than timber, which are extracted from forests for human use. The authors gave emphasis to all biological products from forests rather than timber that they regarded as woody products. More so De Beer and McDermott (1989) also pin-pointed that these forest resources hold an important value for the forest dependent communities hence there was no need to label them Minor Forest Products (MFP) .FAO (1999) states that Non wood forest products (NWFP) are defined as goods of biological origin other than wood derived from forests. This term by UN (FAO) purposively excluded wood in all its totality. Lastly, Wong (2000) states that NTFPs are all products derived from biological resources found on forest land but not including timber, fuel wood, or medicinal plants harvested as whole plants'

Unfortunately, the deliberations continue to date, as there is no formal agreement on a global scale of a conventional term to describe these biological products. However, the researcher is

of the view that NTFPs definition should include all biological products acquired from plant life of forestry origin that include vegetal NTFPs and faunal NTFPs except timber. This study will adopt the definition by De Beer and McDermott (1989) because it encompasses all biological materials and excluded timber products.

2.2 TYPES OF NTFPS HARVESTED IN SUB-SAHARAN AFRICA

Grosskinsky (2000) describes Woodlands in sub-Saharan Africa as an important source of numerous wild plant and fungus foods that include fruits, leafy vegetables or edible herbs, woody foliage, roots and tubers, wild cereals and grains, seeds, nuts and kernels, edible fungi, and a range of processed products such as traditional beers and palm wines and fats and oils extracted from nuts and kernels. Ros-Tonen and Wiersum (2004) went further to categories NTFPs into groups that included food, forage, medicinal products, construction materials, utensils, bio chemicals, aromatics and ornamentals. There is inadequate empirical information on the resources used, the amounts used and frequency of use.

2.3 FOOD

2.3.1 FRUITS

O'Brien (1988) observed that approximately 1365 woody species harvested in the Central Africa region are edible. In the Miombo woodlands of Malawi, more than seventy five species of edible fruits have been recognized, although not all are in common use (Akinnifesi et al, 2004).The following are among the popular fruit species from the Miombo region *Uapacakirkiana*(***muzhanje***),*Parinaricuratellifolia (**muchakata**), Strychnoscocculoides* (***muhacha***), *Ficussur (**Muonde**), Diospyrosmespiliformis*(***munhunguru***) *and Azanzagarkceana*(***mutohwe***).Chidumayo and Gumbo, 2010 states that popular fruit species in the semi-arid regions are*Hyphaenethebaica, Balanitesaegyptiaca (**ububese**), Tamarindusindica (**musika**), Adansoniadigitata (**muuyu**), and Ziziphus Abyssinia* (***Muchecheni***).Grosskinsky (2000) states indigenous fruits are preserved at household levels through fermentation and this has nutrition value as the food is enriched with vitamin B. Moll (1972) states that Marula fruit tree contains approximately four times the vitamin C content of orange juice, while Marula beer provides a source of B vitamins and retains valuable amounts of fruits rich vitamin C, protein and iron content. Despite vast universal knowledge

on the issues of processing and nutritional value of NTFPs, a knowledge gap exists on the actual quantity used per household and the level of dependence on these biological products.

2.3.2 VEGETABLES

Maroyi (2013) observed that, 81% of leafy vegetables species from the forest in Shurugwi under Chief Nhema, Zimbabwe are edible. The researcher noted the following edible vegetables *Cleome gynandra (**Nyevhe**), Corchorustridens (**derere**), Cucumisanguria (**mukakashango**), Cucumismetuliferus (**mugaka**) and Moringaoleifera (**moringa**).* These wild vegetables are mostly used as a safety net in times drought and mostly served with the staple food (***sadza, isitshwala***).It is important to note that the wild vegetables are widely available in summer season in Zimbabwe. Women and girls mostly collect these wild edible vegetables for sale at local markets. This enhances livelihoods to vulnerable groups within the society as women and girls sell these dried vegetables at local markets. Some commercialise these dried vegetables and are also a source of household income for the rural poor. Interestingly, Shackleton and Shackleton (2004) noted that men often eat the wild vegetables during periods of household shocks apparently men rarely collect or prepare them. It is of paramount importance to note that edible vegetables add value to food security for the rural poor. These wild vegetables can also be served with edible mushrooms species such as *Russuala* and *Amanita*. Chang (1980) noted that mushrooms help to contribute to dietary quality. It is essential to note that much research has been done to identify theses vegetables but little has been done to explore the level of dependence on these leafy vegetables from the wild. Despite great achievements in identifying different types of edible vegetables little has been done to determine the levels of dependence at household level.

2.3.3 INSECTS

The most common harvested insects species in Sub-Saharan Africa are termite (***Isoptera***) , grasshoppers(***Arthropoda Subphylum***) ,locusts(***Gleditsiatriacanthos***), and katydids (***Orthoptera***) ,lake flies (***Diptera***) caterpillars (***Lepidoptera***) and ants (***Hymenoptera***).These insects are used basically for household food and the practise is known as entomophily. Gerfand (1971) noted that women, sometimes assisted by children, are mainly responsible for harvesting and processing edible insects for consumption and /or sale, with a few exceptions. Basically women harvest and process these insect's (*ibid*). Vantomme et al., (2002) supports

this view and he indicates that the NTFPs sector has generally been overlooked by national-level forestry programs. In Bangui, Central African Republic, for example, an individual consumes approximately 131g of fresh caterpillars per day during the harvesting season, as opposed to 83g during other times of the year (N'Gasse, 2003) .In light of such facts, then, it is important to note that forest managers and practitioners have little data about the stock and copiousness of edible insects. Moreso there is little research on the level of importance and dependence presented by these edible insects.

2.3.4 MEDICINE

Different plant parts are used for ethno pharmaceutical purposes in Sub Saharan Africa. These include roots, corms, bulbs, tubers, bark, wood, leaves, flowers, spores, fruits, seeds, seedlings and latex (Osemeobo and Ujor, 1999). Over 35,000 to 70, 000 species of plant have been observed globally for medicinal purposes (Hamilton, 1992). These plant species have been used for traditional subsistence medical purposes. These plants include *roots, corms, tubers wood, leaves, flowers, spores, fruits, seeds and latex.*Ndoye and Tieghuhong (2004) observed in Cameroon's Mbalmayo forest reserve found that over 70% of the population depended on herbal medicines, and that these were 50 to 90% cheaper than pharmaceutical equivalents. Within the same plant the use of parts may vary depending on the treatment of the ailment like skin rush and stomach pains (Osemeobo and Ujor, 1999).In this regards this shows that traditional plants have a multiplier effect. Organized and documented information on the use and marketing of medicinal plants in other parts of dry forest and woodland regions in sub-Saharan Africa is largely fragmentary because most policy makers ignore the importance of the ethno pharmaceutical uses with the exception of some case material from Kenya, Nigeria (Osemeobo and Ujor, 1999). Not so much research has been done to determine the level of dependence and importance on traditional medicines used at household level because healthcare is promoted through the use of clinics and hospitals. More so the healthcare policy in Zimbabwe pays little attention to traditional medicine as it promotes the use of pharmaceutical prescribed medicine this missing recognition is critical.

2.3.5 Construction

Hawkes, (1992) observed that thatch grass was observed as a construction material. The same author noted that grass genera such as *Eragrostis (**chufa**),Leersiahexandra (**nzai**),*

and*Hyparrhenia (**mushangishangi**)* remains vital in most areas in the Sub Saharan region. Thatch grass remains important in Sub Saharan region because corrugated roof materials are expensive. This has been exacerbated by rife poverty. Most of the biological construction material is freely accessed thus resulting as a key resource for many poor communities. It is important to note that artificial corrugated roofs are more popular in sub-Saharan Africa though there are hotter than thatch or palms. Timmermans (2004) noted that in some tribes cultural norms dictate that at least one dwelling in the homestead must be thatched. In very poor areas such as the area of Mozambique and South Sudan, thatch remains the main roofing material on almost all dwellings. Palm leaves also are important in house construction for both walls (plaited sheets) and roofing (Chidumayo and Gumbo, 2010). In Eritrea, the average traditional house requires some ten 'camel loads' of palm leaves a year for routine maintenance (Araia, 2005).In light of such facts it is important to note that some NTFPs are not for sale but other products can be used for as an alternative to limit market purchase. Despite such importance presented by construction materials from the wild, most policy makers and Non-governmental organisation avoid the usefulness of these resources as an economic developmental asset for the rural poor. Thatch grass management receives little attention from rural extension departments despite the continual dependence and over exploitation by forest dependent communities.

2.4 ESTIMATED YIELD FROM NTFPS

NTFPs harvested in Sub Saharan region play a critical role at household level, extending from being a source diet, remedies and construction. Increasingly due to rife poverty in the region, forest dependent dwellers are either vending products formerly used only for subsistence and cultural purposes. This has been exacerbated by high levels of unemployment and financial market failure. It is estimated that several million people earn their primary cash income from the sale of NTFPs (Kaimowitz, 2003). Surprisingly, most research done in Zimbabwe has not revealed estimated use per household, district and even at national level. This missing knowledge is critical because to ensure market based development.

ICT (2006) noted that Zambia and Tanzania woodlands are the top producers of honey in the Sub Saharan region. The institution noted that in 2005 Zambia harvested 219 tonnes of honey valued at a market price of US$491, 000 whilst Tanzania exported 466 tonnes with a value of US674, 000. Since the introduction of the Honey Market Tracking System (HMTS) both

countries export volumes have risen to 20 to 30% since 2001. Little effort has been done in Zimbabwe to generate a system that can track the estimated yield of NTFPs per household. This missing information is critical in enhancing food security and livelihood security.

2.5 GENDER AND HOUSEHOLD UTILISATION OF NTFPS

Most research in Sub Saharan Africa indicates that both females and males participate in the harvesting and household utilisation of NTFPs. Ghatak (1995) postulates that both men and women participate in the harvesting and utilisation of NTFPs. The researcher observed that in most cases in rural Zimbabwe men participate through the collection and mostly women do the processing of NTFPs. FAO (2008) indicates that both women and men contribute cash income to the household, and that women's contribution to household income is approximately 50%. NTFPs enhance gender equity among different groups within societies because they are easily accessible for all groups within rural communities. So it is essential to comprehend how gender roles affect and shape the utilisation of NTFPs products at household level. Moreso research reveals that at community level in Sub Saharan Africa forestry ownership and control remains a male domain, whilst females, youth especially young girls are sources of labour. Hecht et al. (1988) note that in Brazil, women are the primary collectors, processors and marketers of Babassu palm (*Orbignyaphalerata*) kernel oil, and have direct control over the income produced. Neumann and Hirsch (2000) observed that Ugandan women do most of the processing and marketing of Shea butter however men have full control over the proceeds from nuts they have collected after the women process and market them. Cavendish (2000) states that in rural Zimbabwe, men are generally associated with activities that involve the collection and use of wood and hunting, whilst women collect wild edible fruits and herbs.

2.6 FACTORS AFFECTING NTFP USE AT HOUSEHOLD LEVEL

Despite overwhelming benefits from NTFPs, these biological products from the wild are not given a high priority specifically in developmental projects. Defo (2004) supports this view as he indicates that there is often no policy to promote NTFPs in the Africa's woodlands. The same author also noted that few resources are given to researching or monitoring NTFP exploitation, and most national forest codes do not regulate this. Moreso where licenses and

permits are used, there little or no enforcement to protect the vital NTFPs. Therefore, the importance of NTFPs for rural livelihood is generally ignored.

2.6.1 CLIMATIC CONDITIONS

Hulme (2005) is of the view that natural resources have undergone serious deterioration and depletion and no respite is expected under climate change. Zimbabwe has been hit numerous droughts since the beginning of the millennium. The diversity and availability of NTFPs in the dry forests and woodlands of Africa are threatened by changing climatic conditions. Ecological conditions which will invariably affect the development, utilization, domestication, sustainability and commercialization of these products. Therefore climatic variability is a major setback to the utilisation of NTFPs hence it minimizes the livelihoods of the rural poor.

2.6.2 MARKETING OF NTFPs

Widespread changes in forest governance that favour strengthened local rights over forest resources and more secure land tenure with positive impacts for access, sustainable resource use, and management and intensification of production (Scherr, 2004; Belcher, 2005) .Poor road networks and infrastructure also hinder the marketing of NTFPs. Market monopoly by large forestry companies also threaten the profitability of the trade of NTFPs. N'Gasse,(2004) states that lack of organisation of harvesters, traders and processors (e.g. producer cooperatives or unions for artisans) coupled with poor market information, for example, means that producers cannot respond to market demand nor benefit from increases in price, while traders and sellers often have erratic supplies. It is important to note that poorer households sell the NTFPs during times of household shocks whilst wealthier households dominate through the extensive commercialisation of NTFPs thus widening the poverty gap.

2.6.3 LOCATION

Household location from the near-by forest affects the utilisation of resources. Angelsen&Wunder, (2003) are of the view that there is a difference between '*forest dependence*' and using accessible natural resources that offer a cheap alternative. Distance from an urban market means high costs associated with transporting the NTFPs whilst households near urban areas are able to minimize transportation costs thus enhancing rural livelihoods .It is important to note that households nearer to forests have increased access and income from the sale of NTFPs. There is a critical knowledge gap whether or not household's located near forests actively alter the environment by encouraging extensive daily use of NTFPs as a safety net.

2.6.4 AGE

NTFPs utilisation and processing is also determined by age. Cavendish (2000) states that NTFPs and related activities have few entry barriers and together with their nutritional benefits, can contribute significantly to the livelihoods of the elderly, households with an elderly head, or children who opportunistically collect wild edible fruits, insects and small mammals, while travelling to school, herding livestock and so forth. Most literature in Sub Saharan Africa indicates that age affects the domestic labour required for the utilisation and processing of NTFPs. Households that tend to have an older population have limited utilisation opportunities of NTFPs as some products require a lot of manual work during processing for an example the mopane however households with a younger population have a greater access to NTFPs. Furthermore age is also interlinked with dependency ratio and this affects the extent of utilisation positively or negatively.

2.7 Conclusion

The discussion above shows that there is an extensive knowledge gap pertaining to the value of NTFPs and their role in enhancing of rural livelihoods. NTFPs have been undervalued because most research work done has unsuccessful scrutinised the array of utilisation by rural communities. Kaimowitz (2003) estimated that several million people earn their primary cash income from the sale of NTFPs. However Kaimowitz (2003) study generalised the concept of

primary cash income as the author failed to show the usefulness of household income from NTFPs. McGregor (1995) identified different types of leafy vegetables in Shurugwi district conversely the study failed to identify nutritional value, ethno pharmaceutical and ethno veterinary uses of leafy vegetables. Chang (1980) noted that mushrooms help to contribute to dietary quality. It is essential to note that much research has been done to identify theses vegetables but little has been done to explore the level of dependence on these leafy vegetables from the wild. This is mainly attributed to lack of technical and institutional support. So it is the task of this this research to explore the levels of dependence and uses of NTFPs in Zimbabwe primarily focusing on Nyautongi woodland in ward 8 of Chirumanzu district. In synopsis poverty in the Sub Saharan Africa continues to be rife and rural livelihoods continue to be insubstantial but yet the contribution from NTFPs is side lined by most policy makers and stakeholders.

CHAPTER 3- RESEARCH METHODOLOGY

3.1 THE RESEARCH DESIGN

Jorgensen (1989) described research design as a blue print which guides the research in achieving preferable set of objectives. The researcher used a case study research design in ward 8 of Chirumanzu District in achieving preferable set of objectives. Bromley (1990) described the case study research design as a systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest. The strength of case study research design is that it covers a wide range of social, cultural, and political factors that are potentially affect Non-timber forest products use in the enhancement of rural livelihoods.

The researcher used this research design because of its scientific credentials which involves both qualitative and quantitave approaches. Furthermore this allowed in data triangulation where questionnaires, interviews, focused group discussions and observation were used in this study. Qualitative approach was used to describe the use of NTFPs whilst quantitave approach was used to estimate the average yield per household. This enabled the researcher to gather information from multiple methods of data collection thus it enhanced the credibility and validity of the research making it easier to analyse data and to draw conclusions and outcomes.

The qualitative research design was used to assess and identify the role of Non Timber Forest Products in the enhancement of rural livelihoods in ward 8 of Chirumanzu District. This was important because it recognised the inherently subjective nature of social relationships. Quantitative method was used to quantify the amount of NTFP's which were harvested in Nyautongi Woodlands thus enabling the researcher to use statistics to generalise the findings.

3.2 TARGET POPULATION

The target population is described as the entire aggregation of respondents that meet the designated set of criteria (Burns, 1997).The target population for questionnaires in this study constituted 250 households in ward 8 of Chirumanzu District who use NTFP's for the enhancement of their livelihoods. The sample size was 50 households out of 250 households. The researchers choose a sample size of 50 houses because a sample size that ranges from 10

% to 20 % provides more reliable results and this represented the total population that is utilising NTFPs. These households where selected as the target population because they directly utilise NTFPs from Nyautongi woodlands

For semi-structured interviews different rural extension services were targeted. This sample included different field officers from included Forestry Commission, Chirumanzu Rural District Council (CRDC) and the village heads. These where selected because of their direct involvement with the community and their importance in providing technical support in the management of natural resources. Semi-structured interviews were used to collect qualitative data that allowed respondents the time and scope to talk about their opinions pertaining NTFP's utilisation. Chirumanzu Forestry Extension Officer (FEO) was interviewed with special concerns to Statutory Instrument 116 of 2012 Forest (Control of Forest, Timber and Forest Produce) and its impacts on rural livelihoods at household level. The statutory instrument 116 of 2012 forbids the commercialisation of forest products without a Forest Permit (FP) which cost US$20 per day. Moreso the Chirumanzu Rural District Council officer was targeted concerning the land tenure issues of Nyautongi Woodlands. The researcher interviewed the RDC officer to gain adequate information about access to basic services including administration, planning and evaluation of forestry livelihoods of ward 8 of Chirumanzu District.

3.3 SAMPLE AND SAMPLING PROCEDURE

Trochmi (2006) referred sampling procedure as a process of selecting units of study from a population of interest so that by studying the researcher may fairly generalize the results back to the population from which they were chosen. Creswell (2009) noted that purposive sampling confines and narrows the research to specific important stakeholders who meet the required characteristics of the study subject. The researcher used purposive sampling on the selection of the field officers within the ward because they provided rich data to the researcher pertaining to NTFP's role in the enhancement of rural livelihoods and this provided appropriate characteristics required of the sample member. Furthermore, purposive sampling technique was used to select Forestry Commission officer (FEO) and Rural District Officer (RDC) because of their direct involvement in the sustainable management of Nyautongi Woodlands. Purposive sampling technique helped the researcher reduce variations and it therefore simplified analysis data.

The researchers adopted simple random technique in distributing questionnaires. It was random in the sense that there was no certain structure followed in selecting respondents. This method gave all 13 villagers of Ward 25 of having equal chances of being selected and it minimized biasness. All names of the villager's household's heads were written down on small pieces of paper and were put in a hat. From a target population of 250 households in Ward 25 engaged in the utilisation of NTFP's, the researcher used a sample size of 20%, which results in 50 households being selected. The selected 50 households constituted the sample that utilised NTFPs from Nyautongi woodlands. Fowler (2009) supports the use of a sample size range of 10-20% because it provided reliable results. There after a sample size of 50 households were randomly picked. The researcher administered the questionnaires in the study area. The self-administration of the questionnaires was pivotal because the questionnaires where difficult for some to understand (*English language*) and some of the elderly respondents where illiterate

3.4 DATA COLLECTION INSTRUMENTS

3.4.1 QUESTIONNAIRE SURVEY

A questionnaire is a written form with pre planned set of questions designed to yield specific information to meet a particular need for research information about a pertinent topic (Key, 1997). Questionnaires helped the researcher to answer specific objectives that included determining the nutritional and medicinal purpose of NTFPs at household levels The researcher used questionnaires (Appendix 1) to solicit data from the target population using standard questions that revealed the respondents attitudes, perceptions, and habits with regards to NTFP's. This helped the researcher to produce consistent information which was easy to analyse. Nonetheless, some questions were also geared to elaborate on the knowledge and awareness of the community, thereby drawing not only empirical data but subjective information as well. The researcher was able to contact the sample easily and efficiently using questionnaire thus it saved time. Moreso the questionnaires where easy to standardise for example, every respondent was asked the same question in the same way. The researcher used open ended questions in order for respondents to qualify their thoughts and understanding of the use of NTFP's. The advantages of the open-ended questions include the possibility of discovering the responses that individuals give spontaneously, and thus avoiding the bias. The researcher personally administered information on questionnaires that

identified various NTFPs harvested and to determine the level of dependence on these biological products and interpreting the questions to some respondents which were time consuming.

Table 3.1 Sampling frames (sample of 20%) of Nyautongi Community

Village Name	Number of households per village	Number of questionnaire per village	Number of local observer per villager
Kwangwari	30	6	1
Mabhachi	20	4	1
Mikairi	25	5	1
Matibe	25	5	1
Mbudaya	20	4	1
Mhangiri	15	3	1
Mutindo	20	4	1
Muraro	15	3	1
Nhadza	20	4	1
Mabwe	10	2	1
Paradza	10	2	1
Vengesa	20	4	1
Zinyoro	20	4	1
Total	250	50	13

3.4.2. Focus Group Discussions

Focus Groups Discussion (FGDs) were used to collect information from the Woodland Management Committee and non- committee members. Focus group discussion helped the researcher to answer specific objectives that included quantity of NTFPs harvested and the level of dependence on these biological products. Focused Group Discussions were used to help explain results found through other data collection methods, such as observation and questionnaires made by the researcher Focus Group Discussions helped explaining the

reasons behind the utilisation of NTFP's and the challenges encountered in free access regimes in Natural Resources Management. A total of 13 participants were selected in the Focus Group Discussion. This was useful because it was very simple, efficient and practical way of getting data about things that the researcher couldn't easily observed .Focus Group Discussions enabled intensive interaction and debate among the members of the selected sample hence providing diverse views and attitudes towards the role of NTFP's in the enhancement of their livelihoods.

3.4.3 DESK TOP STUDY

Desk top study was an effective tool because it provided the researcher with data pertaining to types of NTFP's harvested and the estimated yield per season. Desktop study was pivotal in the study because it helped the researcher in answering some of the specific objectives that included the total yield harvested from Nyautongi woodlands back dating from year 2000-2010. Midlands Forestry Commission provided the related literature pertaining to the harvested NTFPs from the woodland. This information was pivotal in drawing up questionnaires.

3.4.4 INTERVIEWS

Interview refers to a discussion with someone in which one try to get information about the study (Thomas, 2009). Semi structured interviews were used by the researcher to get information about the role of NTFP's in the enhancement of rural livelihoods. These key informants were drawn from, Chirumanzu Rural district Council (Appendix 2).Forestry Commission (Appendix 3) and 13 village heads (Appendix 5). The researcher asked simple questions to limit confusing the participants. The interviews where pivotal because they provided in-depth information from the participants such as their own perceptions about the nutritional and medicinal purposes presented by NTFPs. The interviews also demanded more time in making appointments and getting relevant permission to talk to the management .During the interviews the researcher used a highlighter to mark important points during the interview. Table 3.2 shows the Respondents that where interviewed.

Table 3.2 Respondents Interviewed.

Interviewee	Reasons for interviewing
Chirumanzu Forestry Commission Officer	Familiar with ➢ The management and utilisation of NTFPs ➢ Forest Produce Act and the implications of Statutory Instrument 116 of 2012(Control of Firewood, Timber and Forest Produce Regulations) in the movement and commercialisation of NTFP's at household level ➢ information pertaining to challenges encountered in the sustainable management of the woodland
Zibagwe-Chirumanzu Rural District Council Officer	Familiar with ➢ Knowledgeable on issues related to the social , economic and political activities in the area ➢ The implications of the Communal Lands Act pertaining to Land Tenure of Nyautongi Woodlands and its impacts to sustainable livelihoods
13 Village Heads	Familiar with ➢ To understand about the ethno pharmaceutical and ethno veterinary uses of NTFPs ➢ The implications of the Traditional Leaders Act in the management of Nyautongi Woodlands. ➢ The history of the area under study with special reference of NTFPs.

3.4.5 OBSERVATIONS

Kumar (2011) described observations as a purposeful, systematic and selective way of collecting and listening to an interaction or phenomena as it takes place. The researcher used

participant observation (appendix 6) whilst administering the questionnaires and during data collection. The researcher used the passive observation technique during the harvesting of NTFP's attain rich data about the categories of NTFPs harvested and estimated yield harvested per season. When the researcher was issuing out the questionnaires, the researcher observed different types of NTFP's used at different household levels and the types of NTFPs commercialised at Charandura growth point. To avoid bias in the observations the researcher used a double-entry notebook to note down different types of NTFPs harvested and their impact on at household level.

3.4.5 SECONDARY SOURCES OF DATA

The researcher used secondary sources of data to determine the nutritional value of NTFPs from already published United Nations publications. Precise information was quickly obtained. Secondary data provides high quality data of information from reliable sources to meet the perspectives of the phenomena under study. The researcher used secondary sources of data to accolade evidence given on questionnaires.

3.5 DATA PRESENTATION AND ANALYSIS PROCEDURES

Quantitative and qualitative types of data analysis were employed by the researcher. Raw data from interviews, questionnaires and focus group discussions was presented in tables, photographs and pie charts. The diagrammatic representation was useful to provide comparisons. This was followed by an analysis of the findings and discussion of the implications of the research results made

3.6 STATISTICAL PACKAGE FOR SOCIAL SCIENTISTS

Statistical Package for Social Scientists (SPSS) is a windows based program used to perform data entry and analysis and to create tables and graphs (including box blots, histogram, line graphs and bar charts).Displaying data that is sorted by a specific variable to selecting certain cases for subsequent analysis. The researcher used analysis of variation (ANOVA) and Duncan's multiple comparison means to scale the household's dependence on NTFPs.

3.7 DATA CLEANING

After the questionnaires were returned, the researcher then went through each questionnaire so as to check if all data had been collected well and correct. The next process involved numbering the questionnaires so that they can be identified well when inputting data into Microsoft Excel and if there are any errors in computer data input they are easily corrected as one can easily refer back to the questionnaire number on the software.

Qualitative data from various sources were examined and presented in different forms. Quantitative were edited, coded and entered in a computer and the Statistical Package for Social Science (SPSS) software version 16 spread sheet was used for the analysis. Descriptive statistics were run to give frequencies and then cross-tabulation was undertaken. Multiple response questions were analysed so as to give frequencies and percentages. Tables and bar charts were used to present different variables.

3.8 DATA CODING AND ENTRY

The researcher involved coding information on the questionnaire that it was inputted on Microsoft excel package before being exported to the two software's, used for data Analysis which are Starter 11 and SPSS Version 16.0. Codes were appraised so that they did not denote to the similar characteristics and also that no data was lost.

CHAPTER 4 -RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents and analyses results obtained from questionnaires, field observations, secondary sources of data and interviews on the role of Non-Timber Forest Products (NTFPs) on the enhancement of rural livelihoods. This chapter includes both quantitative and qualitative analysis of the information collected. The sample size was 50 households

4.2 Demographic Information characteristics of respondents

Table 4.1 shows that the all questionnaires (100%) were administered and all were returned for data analyses. 64 % of the respondents were females and 36 % were their male counterparts. The average age of respondents is 52 years whilst the average age for males is 50 years and 54 years for females respectively. The significance of the average age was pivotal because it shows experience with NTFPs utilisation. 82% of the mainstream population are married and only 8% are single. The average family size was 6 people per household, with 62 % of the households having a family size of 0-5 people. It is of paramount importance to note that the average family size of ward 8 of Chirumanzu District is larger than the convectional rural average household size of 4.2 (ZimStat, 2012).This is significant because most of the families turn to NTFPs to enhance household food system for larger households.

Table 4.1 Demographic Information (Source: Field Data 2014)

CHARACTERISTICS	DESCRIPTION	% OF RESPONDENTS
Gender	Males	36
	Females	64
Household size	0 – 5	62
	6 – 10	32
	11+	6

Age	Males	50
	Females	54
Marital status	Single parents	8
	Married	82
	Divorced	10

4.3 Household characteristics

4.3.1 Gender of Household Head

Results from the study depicted that 82% of the household head were males and 18 % were females as shown in table 4.2. The study area is mainly a patriarchal society. Household heads are important in determining level of dependence on NTFPs and also influence the NTFP income.

Table 4.2 Gender of Household Head

Females	18 %
Males	82 %

Source: Survey data 2014

4.3.2 Gender Responsibilities on NTFPs collection

Fig 4.1 shows that Females (32 %) play a pivotal role in the collection of NTFPs from Nyautongi woodlands. This coincides with the research done by Shackleton&Shackleton, 2004) that labelled NTFPs as *women's goods* because women are the top collectors of these biological resources for household use and commercialisation. Fig 4.1 shows that children (16%) are an important labour for rural communities Based on field observations the researcher noted that female children played an extensive role in the collection of NTFPs as

compared to their male children counterparts. The study findings also credited research findings by Cavendish (2000) who observed that women and female children play a more active role in NTFPs collection than their male counterparts. As a result, the researcher noted that NTFPs formed a reliable niche for women.

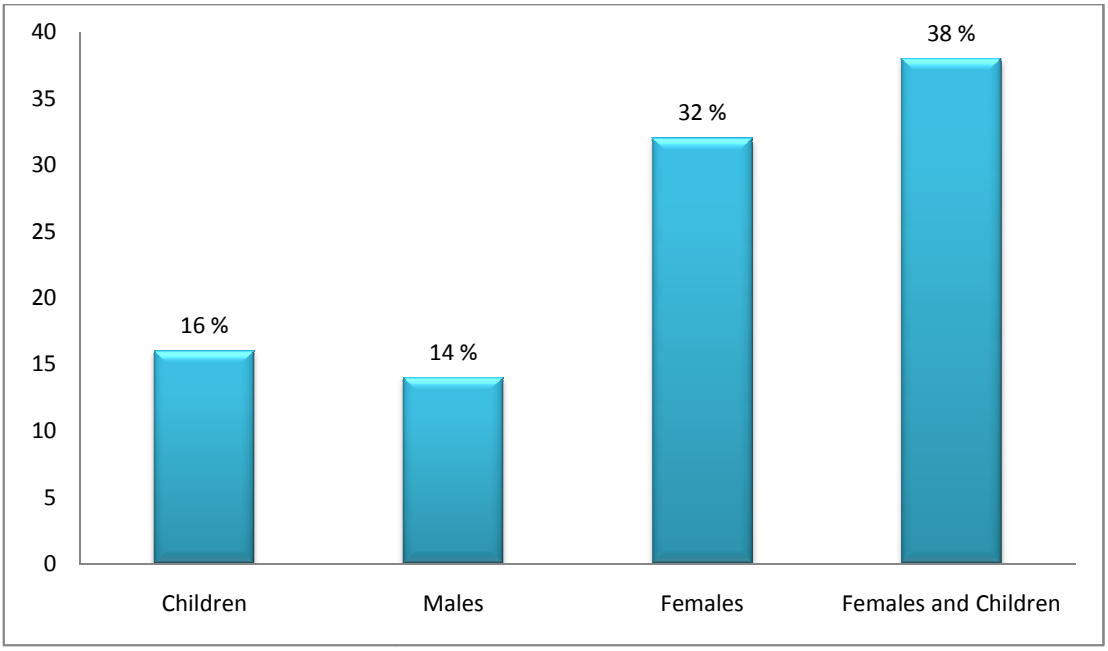

Fig 4.1 .Responsibilities in NTFPs Collection (Source: Survey data 2014)

Table 4.3 Employment of Household Head

	Frequency	%
Employed	4	8
Self-employed	17	34
Unemployed	29	58
Total	50	100

Source: Survey data 2014

The table 4.3 above shows that the majority of the household heads (58%) are unemployed. The high levels of unemployment show that the area is less developed. 34 % of the respondents are self-employed and most partake in cross border sales .Based on informal interviews most of the household heads most embark in the commercialisation of different

NTFPs at Charandura growth Point. Off-farm opportunities include builders, thatchers and as well as handy man also constitute the informal sector. The remainder (8 %) constitutes the employed group. Most of the employed are temporary teachers at Hama Mission High School.

4.4 TYPES OF NTFPS WHICH ARE HARVESTED

Data obtained from questionnaires showed that the community in ward 8 of Chirumanzu district collect various foods from Nyautongi woodlands that include fruits, wild vegetables, herbs and mushrooms. More importantly the community utilise natural construction materials that include fibres and grasses.

4.4.1 FOODS HARVESTED

Ward 8 of Chirumanzu district harvest a wide range of foods that include mushrooms,fish,insects, leafy vegetables and monkeys

4.4.2 Indigenous Mushrooms Harvested

Table 4.4 Gender responses on Mushrooms harvested.

	Sex of interviewee		Percentage
Type of Mushroom	Females	Males	%
Nhedzi	28	16	88
Zheve	19	15	68
Matindindi	24	15	78
Mukakahadzi	18	12	60
Chihombiro	5	4	18

Source: Survey data, 2014

Table 4.4 shows that Nhedzi (***indigenous mushroom***) is the most harvested mushroom type, recording 84 % of the sample size. Based on semi-structured interview with

ChirumanzuForest Extension Officer (FEO) Ms Nyungu indicated that, Nhedzi is the most frequently harvested mushroom because of its high turnover economic value to households. Matindindi (***indigenous mushroom***) is harvested by 78 % of the households whilst Zheve (***indigenous mushrooms***) recorded 68 % of the household usage. Based on semi-structured interview with the village head of Mabhachi, the researcher noted that Chihombiro (***indigenous mushroom***) is the least preferred mushroom type because it is known to be sour when saved with local staple food ***sadza****or* ***isitshwala***. Table 4.4 shows that most females harvest mushroom's as compared to their male counterparts because mushrooms are known to be women products within the area. In an informal interview with one of the household heads, the researcher noted that Indigenous Knowledge System (IKS) forbids the locals to use the Chihombiro mushroom (***indigenous mushroom***) type because it is perceived that it affects digestive system. These study findings are in cordial with works of Addis et al (2005) who articulated that some edible species cause health problems sometimes leading to fatality.

4.4.3 Fruits

Table 4.5 *Vitexpayos* (***tsvubvu***) is the most harvested fruit specie (80%) of the sample population. Based on direct field observations *Vitexpayos* is the most dominant fruit tree species within the Nyautongi woodland and more surprisingly most households have domesticated it. Furthermore children often collect this fruit tree on their way to and from school thus making it the most dominant fruit tree harvested in age groups. *Vitexpayos****(tsvubvu)*** is mostly commercialised by households during the months of March-May were it would be at its apex. *Strychnosspinosa* (**matamba**) recorded 76% and *Azanzagarkiana* (***matobwe)*** recorded 72% .These two fruit species are dominant in the hilly areas of the woodland. *Syzigiumguineensesubap****(Hute) 40%*** and *ParinariCuratellifolia* (***muchakata***) 20% are the lowly ranked harvested fruit trees respectively. Based on direct observations these two fruit species are not frequently harvested because according to the local traditional beliefs there are harvested during the times of drought. Most of respondents do not prefer *ParinariCuratellifolia* (*muchakata)* because of its unpleasant odour thus being utilised by a few.

Table 4.5 Gender responses on Fruits harvested.

Fruits	Sex of interviewee		Percentage
	Females	Males	%
ParinariCuratellifa (***muchakata***)	6	4	20
SyzigiumGuineensesubap (***Hute***)	12	8	40
Vitexpayos (***tsvubvu***)	24	16	80
Ficussur (***maonde***)	10	8	56
Azanzagarkiana***(matobwe***)	23	13	72
Mimusopsmoroi (***chechete***)	23	10	66
Strychnosspinosa (***matamba***)	26	12	76
Annonaamagalensis (***muroro***)	25	11	66

Source: Field Survey 2014

4.4.4 Edible insects

Table 4.6 shows that ***Shwarara*** and ***Madhumbudya*** recorded the most harvested insects with 28 % of the respondents utilising them.***Harati*** was harvested by 24% of the respondents. Based on field observations women were mostly observed collecting insects for relish and children assisted in the collection. Moreso insects are used as supplementary relish in times of household shocks.

Table 4.6 Gender responses on Edible insects harvested.

Insects	Sex of interviewee		Percentage
	Females	Males	%
Harati	10	2	24
Shwarara	8	6	28
Madhumbudya	7	5	28
Makurwe	3	4	14

Source: Field Survey: 2014

4.4.5 Leafy Vegetables

The researcher noted that most of the households harvested leafy vegetables from Nyautongi woodlands. *Cucumismetuliferus* (***Mugaka***) is the most harvested vegetable which recorded 80% of the total respondents. Table 4.7 shows that females mostly harvested these leafy vegetables because of gender roles within the community. *Cucumisanguria* (***mukakashango***) and *Cleome gynandra* (***Nyevhe***) both received 76% of the total respondents and *Corchorustridens* (***derere***) 74%. Based on field observations poorer households used these leafy vegetables than rich families.

Table 4.7 Gender responses on Leafy vegetables harvested

	Sex of interviewee		Percentage
Leaf Vegetables	Females	Males	%
Cleome gynandra (Nyevhe)	26	12	76
Corchorustridens (derere)	23	12	74
Cucumisanguria(mukakashango)	25	13	76
Cucumismetuliferus(Mugaka)	27	13	80

4.4.6 Medicinal Plants

The researcher found out that under the medicinal plants harvested *Lippie javanica* (***Zumbani***) was the most frequently used and it recorded the highest level of 82% followed by *Americana Ximenia* (***mutsvanzvabere***) 62%. These medicinal plants are the most utilised in the area because of their multi-dimensional use. According to semi-structured interviews with the village heads and rural extension services *Lippie javanica* (***Zumbani***) and *Ximenia*(***mutsvanzvabere***) are common because these are used to treat livestock ringworms and more so these can be used as mosquito repellent medicine during hot summer season.

Forestry commission officer Ms Nyungu postulates that medicinal plants important for ethno veterinary and ethno pharmaceutical uses. *Cassia abbrevata* (***Muvheneka***) 52% and *Alloe Vera* (**gavakava**) 44% recorded respectively. It important to note that ***Mutsonzowa*** recorded a low 34% although it is used to for medicinal purposes to cure Sexually Transmitted Infections (STI). Based on field an observation ***Mutsonzowa***was has harvested through special medical consultation with local traditional healers.

Table 4.8 Gender responses on Medicinal Plants harvested

	Sex of interviewee		Percentage
Medicinal Plants	Females	Males	%
Cassia abbrevata (Muvheneka)	11	15	52
Alloevera (gavakava)	14	8	44
Muchecheni ,Mutsonzowa, Mubhedha	11	8	34
Lippie javanica (Zumbani)	19	12	82
Ficussychamorus (Muonde)	13	8	38
Americana Ximenia (mutsvanzvabere	19	12	62

Source: Survey data 2014

4.4.7 Other uncategorised NTFPs Collected

In this study other uncategorised NTFPs were identified. The researcher found out that *Miombo* leaf litter (***murakwani)*** was the most utilised NTFP type in this study, both females and males overwhelmingly harvested it thus recording 100%. Based on semi structured interviews with village heads ward 8 main livelihoods is agriculture hence Miombo leaf litter (***murakwani***) is used as an alternative to organic fertilizer which is beyond the precipice of

many. These study findings are in cordial with works McGregor (1995) who articulated that in Masvingo Province, the use of Brachystegia woodland leaf litter "murakwani" is known to be beneficial for soil fertility improvement. Table 4.9 shows that 100% of the sample population harvests that *Hyparrhenia*(***mushangishangi***) thatch grass. During field observations the researcher noted that 100% of the target population homestead had two to three traditionally thatched huts. This shows that thatch grass plays a pivotal role in ensuring cheaper and affordable construction material. Fishing (52 %) was observed to be the second most harvested NTFPs in ward 8 because of the great Nyautongi River which is located at the periphery of the woodland. It is important to note that from questionnaires results males mostly dominate in the harvesting of the fish most probably because of the labour intensity and the location of the river which is a bit far from most households. Again birds recorded 34 % and mice 42 % of the total respondents. More-so males still dominated in the harvesting of the mice and birds because the harvesting consumed a lot of time.According to semi structured interview with Chirumanzu FEO, ***"kubatambevakunotoranguva, and uyeunofanirakuteyarivawozotariramangwanaachosakairiibasarana baba nokutimadzimaianengeachibatabatakudzimba"*** These sentiments tell a lot about why men dominate in the harvesting of mice. Finally, the researcher observed that 12% of the total 50 respondents harvested monkeys as a source of alternative relish.

Table 4.9 Gender responses on uncategorised NTFPs harvested

	Sex of interviewee		Percentage
Other uncategorised NTFPs	Females	Males	%
Fish	8	18	52
Birds	2	15	34
Mice	10	11	42
Monkey	0	3	12
Miombo leaf litter murakwani	32	18	100
Hyparrhenia (mushangishangi) thatch and broom grasses	32	18	100

Source: Survey data 2014

In synopsis females dominate the harvesting and processing of NTFPs as compared to their male counterparts. Miombo leaf litter (***murakwani***) and Hyparrhenia (***mushangishangi***) are the most frequently used NTFPs as the entire population utilise them. Vitexpayos (**tsvubvu**) is the most harvested fruit specie because of its ethno veterinary and ethno pharmaceutical uses. Most of the harvested NTFPs types have a greater economic value.

4.5 QUANTITY OF NTFP'S USED AT HOUSEHOLD.

The researcher used questionnaires to establish the average yield harvested per season from different categories of NTFPs. The Average yield per household is shown in Table 4.3

Table 4.10 Average yield of NTFPs harvested.

NTFP TYPE	AVERAGE YIELD	MODE OF TRANSPORTATION
Fish	30kgs	Wheelbarrow
Medicinal Plants Cassia abbrevata (***Muvheneka***)	10 kgs 6 kgs	Head Head
Grass	400 kgs	Donkey Cut
ParinariCuratellifolia(***muchakata***)	40kgs	Wheelbarrow
Syzgiumguineensesubap(***Hute***)	120kgs	Wheelbarrow
Vitexpayos (***tsvubvu***)	250kgs	Wheelbarrow
Ficussur***(maonde***)	80 kgs	Head
Azanzagarkiana (***matobwe***)	240kgs	Wheelbarrow
Mimusopsmoroi (***chechete***)	60kgs	Wheelbarrow
Strychnosspinosa (***matamba***)	120kgs	Wheelbarrow
Annonaamagalensis(	40kgs	Wheelbarrow

muroro)		
Mushrooms	200kgs	Head
Edible insects	1 kgs	Head
Leafy vegetables	10kgs	Head
Miombo leaf litter (**murakwani***)*	500kgs	Donkey cuts

Based on questionnaire evidence and focus group discussions Miombo leaf litter (***murakwani***) recorded the highest amount of yield obtained per household, 500kgs per session. This is so because table 4.9 show that all respondents (100%) in the sample utilise ***murakwani.*** Notwithstanding the fact that ward 8 of Chirumanzu district is an agrarian society which relies mostly on rain fed crop agriculture. Agritex Office (Mr Mazvi) who works in the ward elaborated that, the use of murakwani is part of its rural extension department to promote sustainable conservation agriculture hence it has resulted in the extensive use of murakwani. The researcher also noted that, respondents mainly used murakwani as a supplement to expensive organic fertilizer which is beyond the precipice of the rural poor. According to the village head of Mbudaya, the researcher distinguished that murakwani is mostly mixed with monkey waste which is beneficial to soil fertility improvement. These researcher findings are also similar to the observations done by McGregor (1995) who noted that in Masvingo Province, the use of Brachystegia woodland leaf litter "***murakwani***" is known to be beneficial for soil fertility improvement.

The second highest yield was obtained from *Hyparrhenia* (***mushangishangi***) thatch grass which recorded 400kgs per household. Based on semi structured interviews with Chirumanzu DFEO (Ms Nyungu), the researcher noted that the *Hyparrhenia* (***mushangishangi***) was mainly used for construction purposes. The research findings were also similar to those done by Timmermans (2004) in Mozambique as he observed that in some tribes cultural norms dictate that at least one dwelling in the homestead must be thatched. In some poorer households in ward 8 of Chirumanzu district, thatch remains the main roofing material on almost all the dwellings. Some of the grass is used as grass brooms, for household cleaning. The researcher observed that most households used thatch grass as brooms to sweep the homesteads. Since most brooms last less than six months there is a high turnover in this product.

The mostly commonly harvested fruit tree was *Vitexpayos* (***tsvubvu***) which recorded 250 kgs per household. Based on field observations Vitexpayos is extensively harvested because it is commonly commercialised at Charandura growth point, Spider web road market and Mvuma market. *Vitexpayos**(tsvubvu)*** is essential to 88% of the households in ward 8 of Chirumanzu district. Notably, Vitexpayos (***tsvubvu***) contribute to food security of the rural population by providing a vast array of food which supplies essential nutrients especially at times when other food sources are unavailable (Mithöfer et al., 2003). *Azanzagarkiana* (***matobwe***) recorded an average yield of 240 kgs per household, *ParinariCuratellifolia* (**muchakata**) 40 kgs*Syzigiumguineense*subap (***Hute***) 120 kgs, *Strychnosspinosa* (***matamba***) 120kgs *Annonaamagalensis* (***muroro***) 40kgs. These quantities of fruit trees varies because of the snack nature of consumption

Mushrooms recorded a yield of 200kgs per household because of there are predominant in this area. Medicinal Plants recoded an average yield of 10 kgs per household. Based on focus group discussions edible insects are primarily used as food. Table 4.8 shows that only a few prefer to harvest these edible insects this might be due to a few anti hills. The researcher noted that edible insects form a deliberate part of the household diet. Based on field observation traditional plants were administered through consultations with traditional leaders. It is important to note that of the 10kgs of the medicinal plants harvested 6kgs is *Cassia abbrevata* (***Muvhenek***a) leafs which is burnt and used as a mosquito repellent. Also edible insects amounted to 1 kg per household throughout the year.

Plate 4.1: Medicinal Plants displayed at the International Day of Forests 2014

Leafy vegetables amounted to 10kgs per household throughout the year. According to questionnaires data each household has an average yield of 2 kgs. According to MbuyaNyathi the average yield of leafy vegetables was low because say that, the greater part of the forest was damaged by a veld fire that cut across the ward resulting in extensive loss of bio-diversity.

4.5.2 Household income from NTFPs

The researcher calculated the annual income per household then averaged the total income by the number of respondents. Fig 4.2 shows that the average yield per household is US$ 545. The average household income from NTFPs is above the Zimbabwean Poverty Datum Line (ZPDL) of US$ 510.18 per 5 persons (ZIMSTAT February, 2014).In light of such evidence this shows that NTFPs play a meaningful role in the enhancement of rural livelihoods

The researcher calculated the average income from NTFPs food category which included fruits, fish, mushrooms, insects and leaf vegetables. The total income from this category is US$440 this excluded medicinal plants and grass incomes. It was noted that NTFPs food

category provides a higher household food income which is greater than that of Zimbabwean Poverty Datum Line of household food income of US$159.17 food per 5 persons. (ZIMSTAT, 2014)

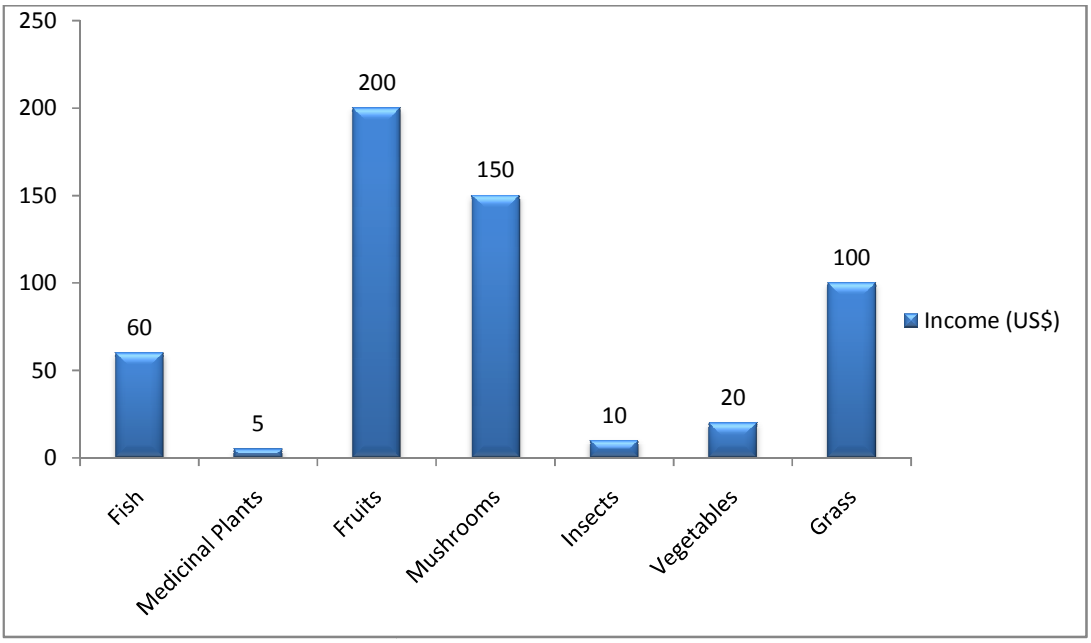

Fig.4.2. Average Household income from NTFPs

Vitexpayos (***tsvubvu***) is the most commercialised product. According to focus group discussion with Nyautongi Woodland Management Committee (NWMC) the most productive market with the highest returns is at Charandura Growth Point were urban vendors buy fruits at a cost of $20 per 20litres bucket of *Vitexpayos* (***tsvubvu***) and other fruit trees. Plate 4.2 shows that VitexPayos (***tsvubvu***) is an income generating fruit for the community.

Plate 4.2: A woman selling VitexPayos at Charandura Growth Point.

Fish contributed US$33 per household per year. According to questionnaires data only 80% of males harvested fish from Nyautongi River. Fish only contributed 6% of the average total income from NTFPs. This is significantly low as compared to 37% income contribution from fruits. Based on field surveys Charandura growth point is a heave of mushroom vendors. Mushrooms contributed an average of US$150 per year. Findings from research in Zimbabwe and elsewhere highlight that although NTFPs contribute a large proportion to most households' income, in terms of quantity, wealthy households tend to consume more, although the poor may be more resource dependent (Cavendish 2000). Nhedzi and Zheve indigenous mushrooms have the highest income contribution to households.

Grass (thatch grass) and broom grass contributed US$100 to household income. According to focus group discussions most of the thatch grass is sold to other wards within Chirumanzu District. Broom grass contributes about 20% of the total income produced by the sale of thatch grass sales. During an interview with Agritex officer (Mr Mazvi), indicated that some of the households sell broom grass products US$1 for 3 and this has provided employment for the youths who are not formally employed.

The researcher noted that Hyparrhenia (***mushangishangi***) thatch grass is a sustainable livelihood in providing income and employment for both the economically active and inactive group. Only one household commercialised medicinal plants (local traditional healer).During an interview with the local traditional healer, the researcher observed that traditional plants ranged from US$0.50 a bundle of fibres and most the species where for ethno-pharmacological use only.

4.5.2 NTFPs income use at household level

Fig 4.3 shows that 95% of the females use NTFPs income to purchase household food. Evidence from focus-group discussions show that most of the income is used to purchase basic food commodities like mealy meal, salt, cooking oil and sugar. Most females are concerned with household food security resulting in the extensive utilisation and commercialisation of NTFPs. Cavendish (2000) observed that resources dominated by women are determined by the skills required to make the final product, for example women collect reeds to make reed mats and other woven products either for household consumption or trade.

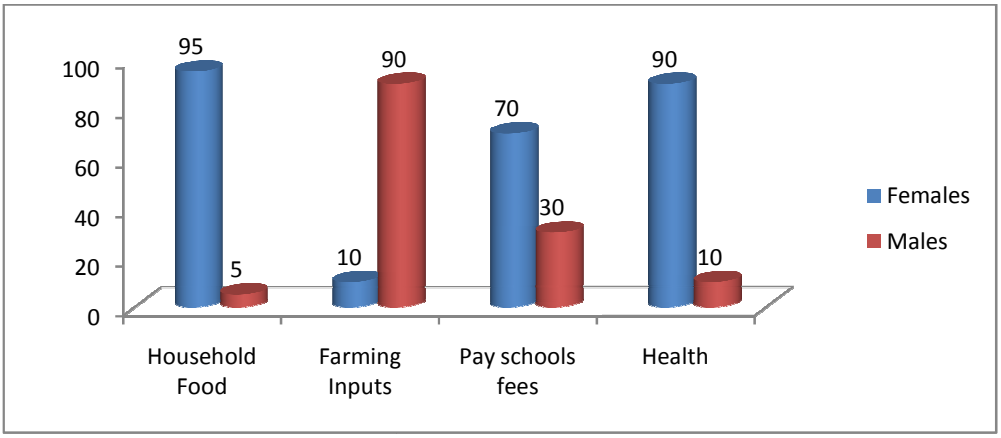

Fig.4.3 NTFPs income use at household level

It is evident that NTFPs are an important livelihood to rural communities. Although NTFPs are seasonal , most of the respondents noted that household income will be minimum or less during the absence of NTFPs. Paradoxically , males spend most of the income from NTFPs on farming inputs 90 % as compared to their contribution on household food more so females use spend less than 10 % on farming inputs. Based on semi structured interviews with the village head most males spend NTFPs income buying farm inputs because the sodic soils which are found in Nyautongi are heavily degraded. 90% of the annual income use per household shows that the community is highly dependent on food.

4.6 NUTRITIONAL AND MEDICINAL VALUE AND USES OF NTFPS

The researcher selected the most harvested NTFPs to determine the nutritional and medicinal values and uses at each household. Table 4.11 shows the selected indigenous and exotic fruit species fruit species used to determine the household nutritional value. The researcher compared indigenous fruit chemical composition and exotic fruit tree composition to determine the nutritional value.

Table 4.11 Comparison of household nutritional value of Indigenous and Exotic Fruits

Species	**Energy Kcal (100g)**	**Protein (g) (100g)**	**Vitamin C (100 mg)**	**Iron (mg) (100mg)**	**Calcium (100 mg)**
*VitexPayos*Tsvubvu	-	3.4	0.31	-	-
ParinariCuratellifolia	-	1.5	0.51	0.8	
Ficus Sur (Muonde)	184	0.4	3-14	0.08	23
StrychnosSpinosaMatamba	1370 d	0.4	0.4	1.3	10

Exotic Fruits					
Bananas	400	1.2	18	1	1
Apples	116	0	28	6	28
Oranges	150	1.2	116	1	5

Source: Barbara et al (2013), Calorie Count (2013) and Holland et al (1997)

Table 4.11 shows that *VitexPayos* (***Tsvubvu***) has a greater protein chemical value of (3.4%) per 100grammes as compared to bananas which has a chemical composition of 1.2. Moreso it provides 0.31% of vitamin C which is a perfect antioxidant. Antioxidants are essential for

repairing damaged cells. Generally proteins are essential for the body structure. Holland et al (1997) noted that protein is important for healthier skins and enhances speedy recovery from communicable diseases. So, it is important to note that *VitexPayos* is essential for sustainable rural diets. Though vitamin C chemical content of exotic fruits is higher than indigenous plants, indigenous fruits are pivotal for enhancing sustainable diets to those who can't afford exotic fruits

Forestry Officer (Ms Nyungu) postulated that, Fruit trees have contributed positively to the mineral uptake, which is evident in table 4.11. The researcher observed that the energy Kcal content of *Strychnosspinosa**(matamba)*** is 1370d and an iron value of value of 1.3 which is important for helping red blood cells transport oxygen. Holland et al. (1997) who postulated that most exotic fruit species have a lower Kcal content as compared to miombo indigenous fruit trees. Table 4.11 shows that Apples have a Kcal content of 116, Oranges 150 and Bananas 400. These contents are significantly low as compared to those of *Strychnosspinosa* (***matamba***). The researcher noted that the *Strychnosspinosa* (***matamba***) are important within for school going children because they provide the much needed energy to perform different activities.

Table 4.12 Comparison of household nutritional value of Mushrooms and Beef

The researcher selected mushrooms and beef meat to determine the nutritional contents of the most commonly used relish in ward 8 of Chirumanzu district. Moreso mushrooms were the second ranked main income producer in fig 4.2

Species	**Energy Kcal (100g)**	**Protein (g) (100g)**	**Fats (100g)**	**Carbohydrates (100g)**
Mushrooms	**117.00**	**40%**	**3%**	**4%**
Beef	**-**	**15%**	**10%**	**3.5%**

Source: Lawrie (1991) and Faith *et al* (2010)

Table 4.12 shows that indigenous mushroom provides 40% protein per 100grammes this is more significant than the 15% provided by red meat. .The researcher noted that carbohydrates are essential because is the body's key source of energy. So, mushrooms are essential in

enhancing sustainable diets for the locals. In a focus group discussion with Agritex officer, the researcher noted that mushrooms provide carbohydrates which are 4 calories per gram these are essential in providing lasting energy for the body. However Table 4.12 shows that beef has a fat chemical content of 10% per 100 grammes whilst mushrooms have 3 %. The chemical content of fats might be low as compared with beef but it essential for providing energy and enhancing sustainable diets for the locals. During semi structured interviews with village heads, the researcher noted that mushrooms are used more often than beef because beef is expensive. Beef meat costs US$4, 50 a kg whilst mushrooms are freely accessible.

Table 4.13 Household medicinal value

The researcher selected the most common medicinal plants in the area to determine the household medicinal value.

TYPE OF NTFP	**Part Eaten**	**Medicinal Value**
Muchecheni, Mutsonzowa,Mubhedha	Fruit Bark of the tree	Cures S.T.I Heals sore eyes of livestock Mosquito repellent
Muchakata (Parinuri Curatellifolia)	Fruit Roots of the tree Dried fruits	Anti-biotic Heals consistent stomach pain For Pregnant women
Muvheneka (Cassia abbrevata)	Roots and fruits The bark of the tree	Cures Women reproductive Skin allergy Snake bits

Zumbani (Lippie javanica)	Leafs	Coughs *Nyon'o* Teeth aches Herbal tea
Muonde (Ficussychamorus)	Fruit juice	Herpes Pesticide for the granary Pesticides for exotic leafy vegetables

According to questionnaires, only one household commercialised ***Muchecheni*** and this was the local traditional healer. In an interview with the traditional healer, the researcher noted that Muchecheni plays a pivotal role in the health care of the rural people especially those that are sexually active group. The research findings are similar to the reports realised by WHO (1990) that despite of deafening escalation of synthetic drugs in the last couple of decades, medicinal plants still play a vital role in the life's of the rural people in many parts of the developing world

*ParinuriCuratellifolia****(muchakata)*** and *Cassia abbrevata (****Muvheneka****)* are pivotal in the women reproductive health. According to one village head ***Muvheneka*** heals ***jeko*** in Shona. This is a female reproductive disease. The frequency with which households use or rely on medicinal plants was not considered as this depends on the health and well-being of the households in question and may vary significantly from year to year as well as within each year.

96% of the respondents used Alloe Vera (***Gavakava)***for heads aches treatment. This was common in most of the households because headaches are a consistent health problem in most household. Based on focus group discussions only a few 3 of respondents have access to

medical aid and the remainder 47 respondents do not own medical aids. In these regard medicinal plants such as Alloe Vera play a pivotal role in supplementing the expensive Pharmaceutical anti-biotic that are used to cure headaches. The researchers show that most anti-biotic cost US$5 whilst traditional indigenous plants cost US$0.50 at the local traditional healer. This shows that traditional medicines play a pivotal role in saving the much needed household income.

*Lippie javanica (**Zumbani)*** coughs Group discussions in both villages indicated that only those with the right knowledge of traditional medicines will sell although a greater proportion will self-medicate.

Table 4.14 Ethnovertinary medicinal value of NTFPs

NTFP Type	**Part Used**	**Medicinal Value**
Muonde Ficussychamorus	Roots leaves	Placentia of Livestock especially cattle
Gavakava Alloevera	Roots Juice Leaves	Diarrhoea of animals
Zumbani Lippie javanica	Leaves Roots	Ticks of livestock

Source: Field Survey 2014

NTFPs are also important for domesticated animals. The researcher noted that most household who rare livestock and most of the households utilise medicinal plants to treat their animals. AGRITEX office in the ward , proclaimed that due to the difficulties and financial constraints most households have resorted to indigenous plants to cure their livestock .Table 4.2 show that 60% of the respondents use these medicinal plants for Ethnovertinary use. Most respondents use *Ficussychamorus* (***Muonde***) to treat the Placentia of livestock especially cattle. Forestry Commission Officer Ms (Nyungu) observed that *Ficussychamorus* (***Muonde)*** is mostly used because of the high cost of the convectional veterinary medicine. *Lippie javanica* (Zumbani) and *Alloe Vera* (Gavakava) are both used to treat livestock especially

4.7 LEVELS OF DEPENDANCE ON NTFPS

The researcher used different types of NTFPs to determine the levels of dependence. In order to determine the levels of dependence the researcher calculated the income gains for household from NTFPs compared from other livelihoods.

4.7.1 Level of dependence on Miombo Leaf litter and Medicinal Plants

Subsistence agriculture is the most major source of livelihood for the households interviewed in ward 8 of Chirumanzu district .Table 4.15 shows that all of the households are dependent on miombo leaf litter (***murakwani***). 100% of the respondents use ***murakwani*** as supplement to conventional organic fertilizer which is highly expensive. The community use the ***murakwani*** as mulching in their CARE Community gardens. Due to rainfall variability coupled with infertile soils, the community has embarked on conservation agriculture for high yield turn over. AGRITEX officer postulated that 100% of the households utilise ***murakwani***because, monoculture agriculture has resulted to massive degradation of the infertile sodic soils which are predominant in the area. This therefore has resulted in a high dependence of ***murakwani.***

Table 4.15 Levels of dependence on Murakwani, Thatch Grass and Medicinal Plants

NTFP Type	**Levels of Dependence**
Murakwani	**100 %**
Thatch Grass	**100 %**
Medicinal Plants	**30 %**

Table 4.15 shows that 30% of the respondents are highly dependent on medicinal plants. The level of dependency is significantly high because of ethno veterinary uses and ethno pharmaceutical.Alloe Vera (***gavakava***) is the most dominant medicinal plant used because of its multiple benefits. The level of dependency is significantly high basing on the fact that only

that there is only one clinic in the area at Hama Mission which is 23 km from Nyautongi Primary School. Ward 8 of Chirumanzu district is heavily infested by malaria pandemic and based on records from Hama Mission clinic each year at list 13 people die because of malaria. The malaria pandemic has forced most of the respondents to be highly dependent on Alloe Vera (***gavakava***) as it used as a mosquito repellent.

Table 4.16 shows that 80 % of the respondents are highly dependent on VitexPayos (***tsvubvu***) because of the nutritional value, medicinal and commercial. VitexPayos plays a pivotal role in enhancing rural livelihoods through the commercialisation of the product. MoresoVitexPayos (tsvubvu) is the most dominant trees specie in the area and provides the supplementary cash for households. Age groups between 31 to 45 years are highly dependent on indigenous fruits because of the employment opportunities provided through commercialisation.The researcher noted that 76 % of the respondents are highly dependent on Strychnos (matamba) because of its high returns. The income from selling indigenous fruit trees accounts for 36 % of the total NTFPs income. The level of dependence from indigenous fruit trees is significantly high as compared to other NTFPs food categories because of the high income value. This is similar to NTFPs income estimates obtained by (Boon 2008) for rural Ghana.

Table 4.16 Levels of dependence on Selected Indigenous Fruit Trees

NTFP Type	Level of dependence
VitexPayos (tsvubvu)	**80 %**
Strychnos (matamba)	**76 %**
AzanzaGarkiana (Matobwe)	**70 %**

4.7.3 Level of dependence on Leafy vegetables and Mushrooms

Table 4.17 shows that 60 % of the respondents are highly dependent on mushrooms. The level of dependence is significantly high because of its well-known dietary qualities. Agritex office postulated that, the level of dependence on edible mushrooms is significantly high in

the area because during the course of the research the community garden borehole had broken down. So mushrooms were the only source of major relish served with staple food. The research findings are fairly the same of Addis, et al (2005) who observed that the recourse to edible mushrooms increases during household shocks. Forestry officer added that, the dependence on mushrooms is significantly high because of the long "shelf value" if properly stored. This allows high household income returns. NTFPs commercialisation is the highest off-farm contributor to household to household income. According to the Agritex officer, high levels of unemployment have exacerbated the extensive utilisation of NTFPs. One elderly man pronounced that

Vanaveduikozvinovavekutengesamicheroyemisangokutivawanekuriritiramhuridzavo.

The statement above shows how pivotal NTFPs are in providing a form of employment to the rural poor. Moreso NTFPs are important because they provide off farm employment opportunities

20 % of the respondents are highly dependent on Leafy vegetables. This is significant considering the fact that Cleome gynandra (Nyevhe) are commonly served as a minor dish. It is mixed with tomatoes and exotic leafy vegetables and served with ***Sadza or isitshwala***. The level of dependence between leafy vegetables and edible mushrooms is low because most men usually eat leafy vegetables when there are no substitutes for relish. During a semi structured interviews with Forestry Commission Officer (Ms Nyungu) the researcher noted that females have a higher dependence on leafy vegetables because processing and preparation is mostly done by females and their daughters. Most women in the ward proclaimed that they had the highest dependence on NTFPs as compared to their male counterparts because it was the social responsibility for a woman to look after the well-being of a household. This exacerbated the women's involvement in informal income earning activities at Charandura growth point and Mvuma Market to supplement the household income.

Table 4.17 Level of dependence on Leafy vegetables and Edible Mushrooms

NTFP Type	Level of dependence

Leafy vegetables	**20 %**
Mushrooms	**60 %**

CHAPTER 5-CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

In conclusion, the researcher found out that NTFPs are pivotal for the enhancement of rural livelihoods irrespective of age, wealth or gender of household head. The use of NTFPs in ward 8 of Chirumanzu District shows that different biological products are a safety- net option that is readily available to all members of the community. Both female and male households collect and sale NTFPs to enhance household income. Forest products such as edible mushrooms,*Vitexpayos* (***tsvubvu***),*Strychnosspinosa* (**matamba**), *Harati*and *Cleome gynandra* (***Nyevhe***) play a key role in enhancing food security through sustainable diets and household income. Due to climate variability and frequent droughts most households use NTFPs as part of the greater livelihood portfolio to reduce the levels of vulnerability and household .The researcher found out that NTFPs are critical for ensuring household food security for all households and deserves much attention.

Moreso, the researcher noted that NTFPs also play a pivotal role in human health because most of the biological products possessed a multi ethno-pharmacological uses. Leaves, barks and roots to treat human diseases and also have Ethnovertinary uses which are used to treat livestock ailments.The researcher found out that indigenous fruits provided more nutritional benefits than exotic fruits and are important in poverty alleviation for example Strychinosspinosa (matamba) has a K content of 1370d whilst most exotic fruits like oranges have a Kcal content of 400d.

The respondents are highly dependent on Miombo leafy litter because of limited access to inorganic fertiliser. This was so because of lack of livelihood strategies other than the commercialisation of the biological products. More-so household income obtained from commercialisation of NTFPs is sufficient to uplift most households within ward 8 of Chirumanzu district above US$1 a day poverty line.

In summary it is important to note that NTFPs is an important portfolio in enhancing rural livelihoods and ensuring a sustainable diet for the locals.

5.2 Recommendations

- The Ministry of Small and Medium Scale Enterprise must provide training and promote NTFP entrepreneurship on how to manage these biological products to enable the society to benefit from NTFPs whilst sustainable managing the resources.

- Forestry Commission must develop a NTFP market information system to increase income generation

- Chiefs and Headman must attend and collaborate in all environmental workshops to ensure multi-sectorial approach with different stakeholders on NTFPs developmental programmes.

- Ministry of Health and Social Welfare should promote and understand the use of indigenous medicines to enhance rural livelihoods.

- Chirumanzu Rural District Council (RDC) should maintain and upgrade the gravel road to enhance NTFPs market base through accessible road networks.

- EMA should enhance environmental education in order to curb massive deforestation

- EMA should work hand in glove with the local Traditional leaders to enforce environmental legislation to ensure community participation.

REFERENCES

Akinnifesi, F. K., Kwesiga, F. R. C. T., Mhango, J., Mkonda, A., Chilanga, T. and Swai, R. (2004) *Domesticating priority Miombo indigenous fruit trees as a promising livelihood option for smallholder farmers in southern Africa*, ActaHorticulturae, vol 632, pp15–30

Chang, S. T. (1980) 'Food from microbes: Mushrooms as human food', Bioscience,vol 30, pp. 399–401.

Apples, Bananas and Oranges. (2013) *http://caloriecount.about.com/calories-oranges-i9200* accessed on 05 May 2014

Araia, M. G. (2005) *Revealing the forest hidden value: The case study of Eritrea*, MSc thesis, University of Stellenbosch, Stellenbosch, South Africa

Arnold, J. E. M. and Ruiz Pérez, M. (1998) *The role of non-timber forest products in conservation and development*, in E. Wollenberg and A. Ingles (eds) Incomes from the Forest; Methods for the Development and Conservation of Forest Products for Local Communities, Centre for International Forestry Research, Bogor, Indonesia, pp17–42

Barbra V., Termote,Ickowitz A., Powell.Bronwell (2013).*The Contribution of Forests and Trees to Sustainable Diets* World Agroforestry Centre (ICRAF), United Nations.

Basit, M.A. (1995). *Noon-Woods Forest Products from the Mangrove Forests of Bangladesh*. In Durst P.B & Bishop, A. (eds). , FAO-RAP, Bangkok, Thailand.

Belcher B,2005. *Commercialisation of non-timber forest products*: A reality check. Development Policy Review, 3: 355-377.

Bisong FE and Ajayi AO (2001) *An Economic Analysis of Women's Dependence on Forest Resources in the Rain Forest Community of South Eastern Nigeria*": Global Paper Nairobi

Bromley, D. B. (1986).*The case-study method in psychology and related-disciplines. Chichester*: John Wiley & Sons

Boon E (2008*). Enhancing food security, poverty reduction and sustainable forest management in Ghana through Non-Timber Forest Products farming*: Case study of SefwiWiawso District, published online by EMMANUEL BOON

Burns, R. B. (1997). *Introduction to Research Methods. 2nd ed. Melbourne*: Longman Cheshire.

Cavendish, W.P. (1997). *The economics of natural resource utilization by communal area farmers*.Unpublished Ph.D. thesis, University of Oxford.

Cavendish, W (2000). *Empirical regularities in the poverty-environment relationship of rural households*: Evidence from Zimbabwe, World Development, vol 28 pp1979-2003.

Campbell ,B., Jeffrey ,S Kozanayi ,W.,Luckert ,M.,M Mutamba and Zindi,C(2002) *Household livelihoods in semi-arid Regions*. Options and Constraints, ACIFOR, Bogor

Chandrasekharan C 1995. *Terminology, definition and classification of forest products other than wood. In: Report of the International Expert Consultation on Non-Wood Forest* Products. Yogyakarta, Indonesia. 17-27 January 1995. Non-wood forest products No. 3. Rome: FAO, pp. 345-380.

Chang, S. T. (1980) '*Food from microbes: Mushrooms as human food'*, *Bioscience*, vol 30, pp399–401

Chidumayo E.N and Gumbo D.J (2010).*The Dry Forests and Woodlands of Africa*. Earth scan, USA.

Creswell, J., (2009), *Research Design: Quantitative, Qualitative and Mixed Methods Approaches*, Lewis Publishers, Chelsea, United Kingdom

De Beer, J.H and McDermott, M. (1989) *The economic value of NTFPs in South Asia, IUCN*, Armsterdam

Defo, L. (2004) Rattan exploitation in the Yaoundé Region of Cameroon. In: *Sunderland, Terry and Ndoye, Ousseynou (Eds) Forest Products, Livelihoods and Conservation. Case Studies of Non-Timber Forest Products Systems.*Volume 2, Africa.Center for International Forestry.Pp.291-316.

Faith K., Bulent E., Hasan Y., ERBIL K., Halil S., *Chemical Composition of Four Wild Edible Mushroom Species Collected From Southwest Anatolia 1Celal Bayar University*, Faculty of Science and Arts, Department of Biology, Manisa.

Food and Agricultural Organisation (1999) *The State of World Fisheries and Aquaculture* 1998, FAO, Rome

Food and Agriculture Organization (FAO) 2006.*Can Non- Wood Forest Products Help Contribute to Achieving The Millennium Development Goals?* Rome: FAO, pp. 2-14

Food and Agricultural Organization (FAO) 2008.*An Information Bulletin on Non-Wood Forest Products*. Non-Wood News, FAO, Vol 17, Rome, pp. 12-21.

Fowler, F., (2009), *Survey Research Methods*, Sage Publications, Thousand Oaks, CA

Food and Agricultural Organisation (2012) Government ofThe Republic Of Zimbabwe and Food and Agriculture Organization Of *The United Nations-Country Programme Framework* 2012 – 2015

Fowler, F., (2009), *Survey Research Methods*, Sage Publications, Thousand Oaks, CA

Ghatak, S. 1995. *A recipe for success: Women and non-timber forest products in Southwest Bengal, India. In Voices form the field: Sixth workshop on 'Community management of forested lands,'* ed J. Fox, D. Donovan, and M. DeCoursey, 164-179. Honolulu, Hawaii: East-West Center

Gelfand, M. (1971) *Diet and Tradition in an African Culture*, E & S Livingstone, Edinburgh.

Grosskinsky, B. (2000) '*Nutritional contribution of IWFP'*, in B. Grosskinsky and C.Gullick (eds) Exploring the Potential of Indigenous Wild Food Plants in Southern Sudan. Proceedings of a workshop held in Lokichoggio, Kenya, USAID, Nairobi

Gondo, T., & Frost, P., (2002) *Mopane Worm Utilization and Rural Livelihoods: The case of Matobo District, Zimbabwe*.Unpublished report.Institute of Environmental Studies, University of Zimbabwe.

Hamilton, A. (1992) 'International trade in medicinal plants: Conservation issues and potential roles for botanic gardens', in Proceedings of the Third International Botanic Gardens Conservation Congress, Botanic Gardens, Conservation International, www.bgci.org/congress/congress_rio_1992/hamilton.html

Hawkes, R. K. (1992) '*Thatching grass: Sources, adequacy and potential for local management in the Bulalimamangwe NRMP Area'*, CASS/MAT Working paper 1-92, Centre for Applied Social Sciences, University of Zimbabwe, Harare, Zimbabwe

Holland, B; Welch A.A, Unwin I.D, Buss D.H, Paul, A.A and Southgate D.A.T (1997). McCance and Widdowson's the composition of foods. *Fifth revised and extended edition.The Royal Society of Chemistry and Ministry of Agriculture*, Fisheries and Food, United Kingdom.p280-302.

Hulme, M., Doherty, R., Ngara, T. and New, M. (2005) '*Global warming and African climate change: A re-assessment*', in Pak Sum Low (ed) *Climate Change: Science,Technology and Policy for Africa*. Cambridge University Press, Cambridge

ITC (2006) *International Trade Centre statistics*, http://langues.p-maps.org/pmaps/ index.php?err=sess, accessed 21 March 2014

Lwrie R.A (1991) *Food Science*Sr ,Elvgevier Science and Technology , USA.

Johnson, L. Lindh, U. and Tivell, A. (2001).*Swedish villagers object to FSC certification – but nobody wants to know*. In Forest, Trees and People Newsletter No. 43, Uppsala

Jorgensen, D.L., (1989), *Participant Observation*: A Methodology for Human Studies, Newbury Park, CA, Sage

Kaimowitz, D. (2003*) Not by bread alone…forests and rural livelihoods in sub-Saharan Africa*, in T. Oksanen, B. Pajari and T. Tuomasjukka (eds) Forestry in Poverty.

Key, J.P., (1997), *Research Design in Occupational Education*, Oklahoma State University (u.p)

Kumar, R. (2011). *Research Methodology a Step by Step Guide for Beginners*. 3rd ed. London: SAGE Publications Ltd

Malaisse, F. (1997): *Se nourrir en forêtclaireafricaine. Approcheécologiqueetnutritionnelle*. Les Presses Agronomiques de Gembloux. Gembloux, Belgique.

Maroyi, A. (2013) *Use of weeds as traditional vegetables in Shurugwi District*, Zimbabwe ,Department of Botany, School of Biological and Environmental Sciences, Faculty of Science and Agriculture, University of Fort Hare, Private Bag X1314, Alice 5700, South Africa

McGregor, J. (1995) *Gathered produce in Zimbabwe's communal areas: Changing resource availability and use*, Ecology of Food and Nutrition, vol 33, pp163–193

Michon, G. (2005) *Domesticating forests: How farmers manage forest resources*, IRD-CIFOR-ICRAF, Bogor, Indonesia

Mithöfer, D., J.D.K. Saka, G. Sileshi, T. Ramadhani and P. Dhliwayo, 2003.*Towards the development of Miombo fruit trees as commercial tree crops in southern Africa*. Forests, Trees Livelihoods, 16: 103-121.

Moll, E. J. (1972) '*The distribution, abundance and utilisation of the Lala palm Hyphaeneoriacea in Tongaland*, Natal', Bothalia, vol 16, pp27–636

Moll, E. J. (1972) '*The distribution, abundance and utilisation of the Lala palm Hyphaeneoriacea in Tongaland*, Natal', Bothalia, vol 16, pp27–636

Mugandani R, Wuta M, Makarau A and Chipindu B (2012) *Re-classification of agro-ecological regions of Zimbabwe in conformity with climate variability and change African crop.* Science Journal, Vol. 20, Issue Supplement pp. 361 – 369 Uganda

Neumann R. P. and E. Hirsch. 2000. Commercialization of non-timber forest products: Review and analysis of research. Bogor, Indonesia: CIFOR

N'Gasse, G. (2004) Contribution des insects de la forte à la security alimentary.L'exemple des chenillesd'AfriqueCentrale(English Version). FAO, Rome. URL: http://www.fao.org/docrep/007/j3463f/j3463f00.HTM

O'Brien, E. M. (1988) *Climate correlates of species richness for woody edible plants across southern Africa*, Monographs in Systematic Botany of the Missouri Botanic Garden, vol 25, pp385–401

Osemeobo, G. J. and Ujor, G. (1999) *Non-wood forest products in Nigeria. EC-FAO Partnership Programme (1998–2000) – Project GCP/INT/679/EC Data Collection THE DRY F O R E S T S AND WOODLANDS OF A F R I C A and Analysis for Sustainable Forest Management in ACP Countries – Linking National and International Efforts*, FAO, Rome

Petheram,L.,Campbell,B.,Marunda,C.,TIVEAU,D. and Shackleton, S.(2006) *The wealth of the dry forests.Can sound forest management contribute to Millennium Development Goals in sub-Saharan Africa?* Forest Livelihood briefs, no 4,October ,Cifor ,Bogor

Ros-Tonen, M.A.F. and Wiersum, F. (2004).*The scope for improving rural livelihoods through non-timber forest products: an evolving research agenda*. In: Forests, Trees and Livelihoods, 2004, Vol.15 (2) p.129-148

Saxena, N. C. (2003). *Livelihood diversification and non-timber forest products in Orissa: Wider lessons on the scope for policy change?* ODI Working Paper No. 223, Overseas Development Institute, London, UK

Scherr, S. J. (2004) *Building opportunities for small-farm agroforestry to supply domestic wood markets in developing countries*, Agroforestry Systems, vol 61, pp357–37

Schreckenberg, K.(2004) *The condition of Shea butter* ,vol 2 Africa ,CIFOR, Bogor

SmartWood, (2002) *Non-Timber Forest Products Certification Standards Addendum*. SmartWood, USA

Stack, J., Dorward, A., Gondo, T., Frost, P., Taylor, F. &Kurebgaseka, N. (2003). *Mopane Worm Utilisation and Rural Livelihoods in Southern Africa. Paper presented at International Conference on Rural Livelihoods, Forests and Biodiversity*, 19-23 May, 2003, Bonn, Germany.

Thomas, G., (2009), *A Guide for Students in Education and Applied Social Sciences, Sage Publications*, New Delhi, India

Timmermans, H. G. (2004) *Rural livelihoods at Dwesa/Cwebe: Poverty, development and natural resource use on the Wild Coast, South Africa*, MSc thesis, Rhodes University, Grahamstown, South Africa

Trochim, W.M.K., (2006), *Research Methods Base*, http://www.socialresearchmethods.net,

accessed 10/11/2013.

Vantomme , P (2002).*Forest extractivism in the Amazon: is it sustainable and economically viable activity*.Paper presented to Forest 90 , Manauus.

Vincent, V. and Thomas, R.G. 1960.*An agricultural survey of Southern Rhodesia: Part I: agro-ecological survey*. Government Printer, Salisbury

WHO, (1990).*A manual for health workers in South-east Asia. World Health Organisation*, 1433 pp

World Bank (2004).*Sustaining forests' development stratey*.Theworld Bank, Washington, DC.

ZimStat, (2012), '*Census 2012, Zimbabwe National Report'*, ZIMSTATS, Harare.

ZIMSTAT (2014) *Prices statistics in Zimbabwe*http://www.zimstat.co.zw/index.Accessed on 05 May 2014.

APENDICES

APPENDIX 1

THE ROLE NON-TIMBER FOREST PRODUCTS IN THE ENHANCEMENT OF RURAL LIVELIHOODS.A CASE OF NYAUTONGI WOODLAND MANAGEMENT PROJECT IN CHIRUMANZU DISTRICT.

Questionnaire No. ☐☐☐ Date / / /

Village name: ……. Code ……

NTFP-RELATED HOUSEHOLD QUESTIONNAIRE

My name is MenelisiFalayi. I am currently a fourth year student at Midlands State University doing BSc Honours Degree in Geography and Environmental Studies. I'm carrying out a study on the role of Non-Timber Forest Products in the enhancement of rural livelihoods of ward 8 in ChirumanzuDisrtict.The findings of this study are for academic purposes and planning by Rural Extension Services. I'm kindly asking for your assistance in the answering of questions below

SECTION A: Background Information

Tick where appropriate and complete on the space provided

1. Sex of interviewee: Female ☐ Male ☐

2. Household Head: Female ☐ Male ☐

2. Age: 15-30 years ☐ 31-45years ☐ 46_{+} ☐

3. Marital Status: Single ☐ Married ☐ Divorced ☐

4. Employment status: Employed ☐ Self Employed ☐ Unemployed ☐

5. Level of education: O' Level ☐ A' Level ☐ Degree ☐

6. Household size: 1-5 6-10 ☐ 1 and above ☐ ☐

7. Main Source of Livelihood: Pensioner ☐ Formal Employment ☐
Casual Labour ☐ Sales ☐

SECTION B: TO IDENTIFY VARIOUS Non-Timber Forest Products' HARVESTED.

8. WHO CARRIES OUT THE HARVESTING OF NTFP'S?

Children	Men	Women	Women and Children

9. Types of NTFP's harvested and their household use.

Category	**Local Name**	**Season**	**Use**	**Quantity (kgs)**
Food				
Medicine				
Construction				
Other				

10. Which season has the highest yield of harvest?

January-April	May-August	September-December

11. Reasons for highest yield:

……

12. Which season has the lowest yield of harvest?

January-April	May-August	September-December

13. Reasons for lowest yield:

……..

14. DISTANCE FROM HOUSEHOLD?

Category	Distance **1 - 10mins** **11 - 30mins** **30 minutes >**	Time Spent **Collecting** **1 - 10mins** **11 - 30mins** **30 minutes >**	Mode of transport ***1. Wheelbarrow*** ***2. Head*** 3. ***Donkey Cuts***
FOOD			
Medicine			
Construction			
Others			

15. What is the main problem encountered in the harvesting and household utilisation of NTFPs?

Collection	Transportation	Processing	Market

SECTION C: TO ESTABLISH THE YIELD HARVESTED FROM NTFPS

TO ESTABLISH INCOME GENERATED FROM NTFPS

16. What is the quantity and income obtained from NTFP's harvest?

Category	**NTFP's Type**	**Amount**	**Income Value**	**Use**

		Harvested: kgs		***(a = own use , b =sale)***
FOOD				
MEDICINE				
CONSTRACTION				
OTHERS				

17. What is the money used for……

Household food	Farming inputs	Paying school fees	Health

18. How do you add value to your products for maximum returns?

Selling to Urban Consumers	Cross Border Trade	Trade delay	Others Specify

19. Apart from NTFPs how much do you get from agriculture.

Type of agricultural product	Quantity Harvested	Quantity Sold	Income

20. DO YOU FEEL THAT NTFPS WILL BE AVAILABLE IN THE NEXT TEN YEARS?

YES	NO

21. Has the yield increased as compared to ten years ago 2000-2010?

YES	NO

SECTION D: TO DETERMINE NUTRIONAL AND MEDICINAL VALUE AND USE OF NTFPS

22. What are the type of NTFP's harvested and their Household Food requirements?

NTFP's Type	**Household Food requirement**	**NUTRIONAL value**	**Level of dependence**

23. Apart from household food requirements which NTFPS are used for household medication?

Type of NTFPS	Medical requirement	Purpose

Section E: TO DETERMINE THE LEVELS OF DEPENDENCE ON NTFPS

24. FREQUENTLY USED NTFPS AND LEVEL OF DEPENDANCE

TYPE NTFPS	Score of dependence: No household dependence< *0 1 2 3…. 10 Highest level*

25. Has the level of dependence changed as compared from the previous years (2000-2010)

TYPE NTFPS	Score of dependence

Score codes: 0 = No dependence, 1, 2, 3……..10 = highest

26. Main Threats to NTFP's

Threat	Reason of the threat

Codes 1= deforestation, 2= increase in the utilisation, 3= over population, 4 land clearing.

27. Suggest Possible Solutions to the Problems Identified above

……

……

……

……

APPENDIX 2

INTERVIEW GUIDE QUESTION

SEMI STRUCTURED-INTERVIEW GUIDE TO CHIRUMANZU RURAL DISTRICT COUNCIL OFFICER

Date / / /

1. Which types of NTFP's are Harvested at Nyautongi Woodlands?
2. What is the role NTFPs in rural livelihoods?
3. What are current land-tenure arrangements to develop?
4. Do the Nyautongi community have rights to manage Nyautongi woodland resources?
5. What support is needed to enhance rural forestry livelihoods
6. What mechanisms are in place to foster local collaboration to enhance rural livelihoods
7. What are the challenges encountered in managing Nyautongi woodlands?
   b. Suggest Solutions

Thank you in advance!

APPENDIX 3

Semi Structured-Interview guide to Chirumanzu District Forestry Extension Officer (FEO)

1. What are the strategies to enhance livelihoods?
2. What is your position on the role of NTFP's reflected in the Acts
3. What are the benefits of harvesting NTFP's
4. What do you actually do to recognise NTFPs
5. How are you helping the community to sustainable harvest the NTFPs
6. a. Challenges encountered on depending on NTFP's as a source of livelihood
   b. Suggest possible solutions
7. What is the effect of S.I 116 of 2012 on the movement of NTFP 'S?

Thank you in advance!

APPENDIX 4

Semi Structured-Interview guide to Chirumanzu District AGRITEX OFFICER

1. What are the benefits of harvesting NTFP's
2. What are the harvesting methods
3. How do you help the community.
4. What are the challenges encountered

APPENDIX 5

Interview Guide for Focused Group Discussions for Nyautongi Woodland Management Committee

1. What type of NTFP's harvested in your area
2. What type NTFP's are harvested in the winter season
3. What type of NTFP's are harvested in the summer season
4. Which season is the most productive
5. And why
6. Do the community manage the Harvesting of NTFP's
7. Who influences decision making on the Harvesting of NTFP's
8. Does NTFP's enhance rural livelihoods
9. And to what extent if so
10. What are challenges faced in harvesting NTFP's
11. Are there any possible solutions to the challenges?

APPENDIX 5

INTERVIEW GUIDE FOR VILLAGE HEADS

1. Types of NTFPs harvested in you village
2. The uses of the NTFPs harvested
3. What are the control measures in harvesting NTFPs
4. Problems encountered in the sustainable management of the Woodland
5. Is there any change in the total yield of NTFP's since 2001 to 2013
6. What are the causes of these changes?

Thank you!

APPENDIX 6

OBSERVATION GUIDE FOR THE RESEARCHER

1. Who collects the NTFP's from Nyautongi Woodlands?
2. Harvesting techniques used
3. Total amount of yield harvested per individual and household.
4. Problems encountered in the transportation of NTFP's
5. Solutions to the problems encountered

Thank you!