

**AN ASSESSMENT OF THE CONTRIBUTION OF APICULTURE TO
HOUSEHOLD INCOME AND FOOD SECURITY. CASE STUDY OF
WARD 20, CHIRUMHANZU DISTRICT, ZIMBABWE**

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**A Dissertation Presented in Partial Fulfilment of the Requirement for Bachelor of Science
Honours Degree in Geography and Environmental Studies**

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Declaration

I attest that this is my own work and material used from other sources to compile this dissertation has been acknowledged.

.....

Signature

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Approval form

The undersigned people certify that they read and recommend Midlands State University to accept a dissertation entitled, **“An assessment of the contribution of apiculture to household income and food security. Case of ward 20, Chirumhanzu District,”** by (R137538M) in partial fulfilment of the Bachelor of Social Science Degree in Geography and Environmental Studies.

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Dedication

I would like to dedicate this piece of work to my parents, Mr and Mrs G.G Manuhwa, who have made it possible for me to reach this stage in my education. Their moral and financial support means a lot to me. This dissertation is also dedicated to my brothers and sisters, for the commitment they showed throughout the research process.

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Abstract

The study assesses the contribution of apiculture to household income and food security in Ward 20, Chirumhanzu District. A mixture research design was adopted that is it used both qualitative and quantitative data collection techniques. Data was collected through the use of questionnaires, observations and interviews. Questionnaires were administered to all participants that is a target population of fifty households constituting both males and females who were participating in apiculture. Interviews were conducted with the key informants from Allied Timber Officer, Forest Commission officer, AGRITEX and the Ward councillor. The research findings show that they are three major factors which are influencing people to participate in apiculture. These are source of income and food, availability of forest and bees and as a hobby. The study also found out that apiculture contribute to food security to a larger extent since the results showed that above 90% of the people participating are now food secure and are having at least two or more meals a day. In comparison with the households not participating, the research results reflected that households doing apiculture have more food for survival throughout the year. The factors which are affecting apiculture in Chirumhanzu Ward 20 are heavy rains and heat waves due to climate change, theft and financial backbone. The overall conclusion is that households participating in apiculture have improved their living standards through income generation and improved healthy and diet. Recommendations were made on how best the government and the local people can take advantage of apicultural projects and utilize them to a maximum level to ensure absolute household food security and income generation.

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List of acronyms

AIDS	Acquire immune deficiency syndrome
AGRITEX	Agricultural Extension Services
EMA	Environmental Management Agency
ESAP	Economic Structural Adjustment Program
FAO	Food Agricultural Organization
HIV	Human immune-deficiency virus
IKS	Indigenous Knowledge System
NGO	Non-Governmental Organisation
SPSS	Statistical Products and Services Solutions
UN	United Nations
ZFDF	Zimbabwe Farmer Development Trust
ZIMASSET	Zimbabwe Agenda For Sustainable Socio-Economic Transformation
ZIMVAC	Zimbabwe Vulnerability Assessment Committee
ZRP	Zimbabwe Republic Police

CHAPTER 1: INTRODUCTION

1.1 Background of study

The ongoing global meltdown of the economy has devastating impacts on countries especially developing countries, biting hard on business, organizations, homes and families. In search of an alternative way of alleviating poverty in these developing countries, apiculture offers an unexploited sector which is capable of reliving people from ongoing poverty and hunger (Ajao et al 2012). Generating renewed alertness and participation in beekeeping in rural communities would go an extra mile in eradication economic challenges around the world (Ajao et al 2012).

The world because of the economic meltdown and decrease in annual rainfall which has greatly affected agriculture, now needs survival strategies such as beekeeping which is neither affected by economy nor rainfall patterns. Ayansola (2012) perceived that apiculture will help to minimize the rampant poverty problems in Africa, particularly in the countryside communities. In other words, apiculture which is part of food production, technically known as beekeeping, is a self-sufficiency enterprise which will assist in reducing economic hardships, unemployment levels and other societal vices (Ajao et al 2013).

Apiculture has been neglected yet it is among the potential sources of livelihood. Nwali (1996) states that apiculture is the rearing of bees that produces honey in anticipating to get financial benefits. In the same manner, Achobi and Ikediobi (1985) together with Morse (1989) defines beekeeping as an art of breeding, rearing and management of honeybee colonies in simulated hives for economic improvements. The products produced by bees such as honey and wax when exported they are a source of foreign currency which is a major booster of countries' economies. Honey is the major apicultural product which is produced in almost all nations of the world. The overall world's production of honey in 2013 was valued at 1.2 million metric tonnes (Ajao et al 2012). Nevertheless, approximately 400 000 metric tonnes of the honey is traded in export market per annum and this implies dominance of local market in producing states (Gu et al 2002).

Leitaer (2007) outlined that bee farming can be practiced as an extra source of income generation for farmers in countryside and has been effectively executed in poverty alleviating schemes. Mazorodze (2014) states that beekeeping is environmental friendly, requires limited funds to start up production. Beekeeping project can be quickly engaged again after a crisis phase and essential

skills can be transmitted easily from generation to generation thus making it a sustainable livelihood strategy.

There are many countries in Africa who have adopted beekeeping as their major project for income generation. These countries consist of Kenya, Tanzania, Zambia, Uganda and South Africa. (Mazoredze 2014). These African countries have generally improved their household food security and reduce poverty. For example, in the United States of America, about 100 million kg of honey is produced yearly (Mazorodze 2014).

According to Zimbabwe Independence (2014), poverty in rural areas of Zimbabwe increased to 76% in 2014 from the previously recorded 63% in 2013. This is attributed to poor performance of agriculture due to increased climatic variability and change, affecting rural communities reliant on rain-fed agricultural production. Nyatsande et al (2014) states that apiculture in Zimbabwe started way back as the 18th century and evidence of beekeeping is shown by rock paintings on Matopo Hills. People used to harvest honey from cliffs, caves, hollow of trees and from the ground. With time the modern beekeeping methods were introduced with hope of improving the quality and quantity of honey in Zimbabwe. Beekeeping is seen as an intervention that can improve the livelihood of both farmers as well as the environment as the need for bee forage inevitably requires conservation of trees and forests (Nyatsande et al 2014).

The statistics available by Agritex in 2014 shows that Zimbabwe has 15 967 beekeepers and has the potential to produce 427 105kg of honey (Nyatsande et al 2014). In recent years, Nyatsande et al (2014) alluded that the Ministry of Agriculture, Mechanization and Irrigation Department plays a pivotal role in beekeeping training and providing an enabling environment, while other stakeholders such as Forestry Commission and some NGOs complement the ministry efforts by promoting beekeeping activities. According to this overview of the country's beekeeping sub-sector, there is need for identifying areas that can be improved and venture into investment opportunities.

According to Azeez et al (2014), Ethiopia is producing an estimated value of 44 000 tonnes of honey valued at US\$76.6 million and is the leading exporter and producer of honey in the region and Africa as a continent. Therefore, with this lucrative enterprise, Zimbabwe can also utilize the opportunity and venture into more projects of beekeeping. In Chirumhanzu district, the beekeeping project in ward 20 started in 2008 after the economic hardships which were due to political issues

and the meteorological drought that occurred that year. The people of Chirumhanzu think outside the box and engage in apiculture which is less labour intensity and profit driven. Having outlined this background information, the study therefore seeks to scrutinize the contribution of these apicultural activities to household income and food security in ward 20 Chirumhanzu district.

FAO (2009) states that one that keeps societies out of poverty is one that has access to a range of options. Therefore, apiculture and associated trades can be foundations of appreciated strength for uncountable number of societies in the country side. Rather than just a hobby, apiculture may be seen as a vital source of occupation for the majority of the people in rural areas and part of rural life worldwide (FAO 2009). Hilmi (2011) states that by introducing apiculture as an enterprise and building own pre-existent skills will advance the capacity and knowledge of small scale farmers. Beekeeping offers employment opportunities and development for countryside populace by making them self-sufficient and not depending on the government, they can also be financially enabled through the numerous benefits derived from beekeeping (Oluwole 1999). The researcher therefore seeks to investigate mainly in how this project of beekeeping is contributing to household food security.

1.2 Statement of the problem

Foster (1992) states that in recent decades, poverty and food insecurity will be a major crisis which will affect many communities in rural areas of developing countries. In Chirumhanzu District, there has been very low agricultural productivity caused by low mean annual rainfall patterns. Chirumhanzu lie in natural farming region 3 which receives unpredictable rainfall characterized by mid-season dry spells and have high temperatures which greatly affect agriculture in the area. These climatic conditions has been compromising food production; hence exacerbating food shortages in Ward 20 of Chirumhanzu district. When the people of Ward 20 realized this devastating situation, they took advantage of the tall trees and other wild plants in Mtao Forest and ventured into beekeeping as a livelihood strategy. Beekeeping was started in 2008 by a group of villagers assisted by Environment Africa and later joined by Allied Timbers. The villagers venture into apiculture since they are not receiving adequate food from farming. Therefore, the project came as a strategy to alleviate poverty in this rural community mainly targeting the people of Ward 20. The purpose of beekeeping project in Ward 20 is to increase income generation and improve household food situation. Beekeeping has also been put in place by Environmental Africa as one of the livelihood strategies which can assist communities to adapt to climate change. However, the

contribution of beekeeping to household food security in rural communities has not been widely explored in Zimbabwe. Therefore, this study seeks to examine the contribution of apiculture to household food security in Ward 20, Chirumhanzu district.

1.3 Objectives of the study

1.3.1 General objective

- To investigate the contribution of beekeeping to household income and food security in Ward 20, Chirumhanzu District.

1.3.2 Specific objectives

- To establish factors influencing participation of households in apiculture.
- To assess the ways and extent in which beekeeping enhances household income and food security.
- To assess challenges encountered in beekeeping activities which may compromise its sustainability as a livelihood strategy.

1.4 Justification of the study

The reasons why the researcher is studying the contribution of apiculture to household food security is to outline the importance of the project to the communities. The importance of this study is influenced by the fact that the results will assist in the achievement of the Zimbabwe Agenda to Sustainable Social and Economic Transformation (ZIMASSET) which focuses on the social service and eradication of poverty and food security and nutrition. Therefore, Chirumhanzu district will attain this cluster through embarking in this further study of the contribution brought by beekeeping in ward 20. The study seeks to examine the magnitude to which the contributions of beekeeping are alleviating poverty and food insecurity in order to recommend other methods in which food security at household level can be improved.

With the ongoing persistent drought in the country which has caused families to tear apart in search for survival, the people of Chirumhanzu district have now taken beekeeping as a hobby since it seems like a resilient livelihood strategy. According to Benard (2012) the contribution of beekeeping to rural household livelihood cannot be underestimated particularly to those communities where access to income is limited. The rural communities tend to focus more on crop production and cattle rearing causing apiculture to be underplayed in both planning and policy.

Hence this study pursues to contribute to the already existing literature by further examine whether beekeeping is really adding value to household food security.

Moreover, the institutions and organizations who specializes with adaptation and mitigation the adverse impacts of climate change and strategies to combat hunger and poverty such as Environmental Management Agency and Non-Governmental Organization, will benefit since their projects such as small grains project will have continuity from income and capital generated from beekeeping. It will also benefit the Agency, Forestry Commission and the country as a whole in sustainable management of the natural resources that is the environment where the bees are kept.

With the introduction of this project under study that is of beekeeping in the district there is high probability of development to be seen from the income generated from bee products. There are also many advantages which the bees themselves offer to mankind which this study seeks to contribute them to the communities. The bees themselves complement activities such as pollution of flowers and crops. Additionally, bee products increase farm household diet (Hilmi 2011) and it provides natural health care medications. Therefore with these advantages, the people of ward 20 will increase their living standards thus eradicating poverty.

Households of Chirumhanzu district are also going to benefit in discovering promising solutions to food security by exploiting beekeeping. The products which they are to get from beekeeping such as honey will improve their diet as well as getting income. This study will also benefit the researcher himself by acquiring an in-depth understanding and knowledge on issues of beekeeping. The researcher will also be left in a situation to make essential contribution to institutions and organizations that are attracted in such information to effectively combat food insecurity.

Many scholars have studied on apiculture focusing mainly on its importance to the ecosystems. There has been little attention put on the aspect of its contribution to food security especially in Zimbabwe. Therefore, this study will revivifies people's thoughts and pave way for the next generation of scholars to dissipate more studies on the contributing of beekeeping to household food security in various area such as studying the contribution to the nation as a whole.

1.5 Description of the Study Area

The study was conducted in Ward 20, Chirumhanzu district (Figure 1.1). Ward 20 is located about 33km south of Mvuma and approximately 101km north of Masvingo City. Chirumhanzu is a rural

district in the central part of Zimbabwe. The district is in Midlands Province. The district is administered under the following categories, communal, resettlement and state forest. The coordinates for Chirumanzu district are -19.4167° and 305833° . The district is at an elevation of 441 square metre above sea level.

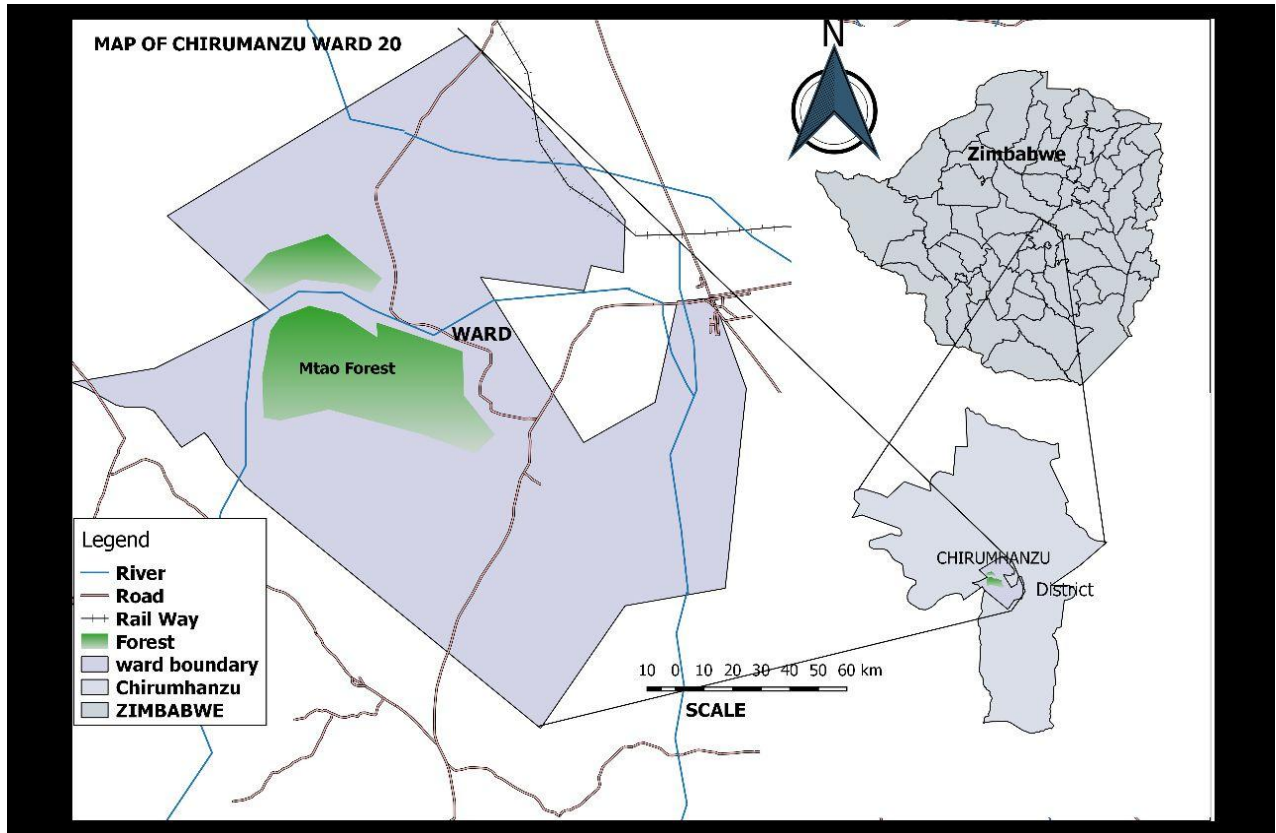


Figure 1.1 Map of Ward 20 Chirumhanzu District, Zimbabwe

The climate of the area is typical Savanna climate with well-defined two distinct seasons that consist of winter (dry) and summer (wet) seasons. The area is generally situated in the natural ecological region 3 (Vincent and Thomas 1960). The temperature of ward 20 ranges from the minimum of 19°C to a maximum of about 30°C and the average temperature is 25°C which makes it a hot area. The rainfall vary from vary from year to year and it is always changing because of the ongoing climate change. The rainfall normally ranges from the minimum of 500mm to a maximum of 800mm, having an average of 650mm per annum. The rainfall pattern is influenced by the migration of the Inter Tropical Convergence Zone (ITCZ).

The soils of Ward 20 are sandy loam. The type of soil influences the growth of Miombo woodlands. This type of vegetation consist of dominant trees such *Brachstygia specifomis*, *Jubernadia globiflora*. The area also have grasses such as *eragrostics* and *hyparrhenia*, these grasses grow on light textured soils at attitude between 450m and 1050m with rainfall ranging between 375mm and 750mm (Elliot et al 1961) . Nyati et al (1994) states that this sweet to mixed veld with predominantly medium height perennial grasses and high proportion of annuals in tree bush savanna have common grasses such as *braachiararia nigropedat*, *urochloa* and *heteropogen contortus*.

There is a high number of deep wells and boreholes in ward 20. Chirumhanzu north in total has 125 profound wells and 400 boreholes of which 391 (96%) are functioning and serviceable (Government of Zimbabwe 2011). In most of the wards in Chirumhanzu district there are more deep wells than boreholes. In ward 20 there is also a lot of livestock hence this dictates the availability of dip tanks. There are about 7 dip tanks in the ward and all are in good condition showing that there is meaningful output in cattle rearing.

The area is dominated by small scale farmers and communal farmers cultivating maize and tobacco. Prevalence of favourable temperatures, rainfall and good soils makes agriculture the economic activity of the area hence the people depend heavily on agriculture for a living. Apart from crop farming, the livestock farming system consist of cattle, goats and poultry. The area of study is located in the Great Dyke belt, hence mining is also done in the surrounding area.

Generally Ward 20 have one major river called Mivhaire. The river has got many tributaries and these tributaries are seasonal, that is, they flow during rainy season only. Due to the prevailing unpredictable and unfavorable climatic conditions, agriculture production has been greatly affected with yields steadily decreasing. During a good rain year, farmers usually produce enough food at household level and even a surplus which they will sell for income.

According to Zimstat report (2014) it shows that the overall population of Chirumhanzu Ward 20 is 5752. The distribution of the population indicates that there are 3142 females and 2610 males. These statistics shows that there was a slight decrease in population from the previous census of 2002 which was 3 512 females and 3107 males. This decrease might have resulted from high rate of migration due to economic instability. The poor performance of the economy and land degradation paved way for beekeeping as a livelihood strategy.

In ward 20 there are about 8 Non-Governmental Organizations. It is important to highlight that they operate district wide (Government of Zimbabwe). Most of these NGOs are mainly concerned about HIV/AIDS and other health issues. These NGOs consist of World Vision, GOAL, CARE International among others. It is of paramount importance to indicate that in Ward 20 there are very few organizations which are concerned about poverty alleviation. Among these few there is SAFIRE which concentrate mainly in nutritional gardens, GOAL which is giving bulls and boar goats. Plan international is the major organization which is spearheading drilling of boreholes in ward 20. Having outlined this, it shows that food security is a major concern due to lack of direct support; hence the need to understand the contribution of beekeeping.

CHAPTER 2: LITERATURE REVIEW

2.1 What Is Beekeeping?

A beekeeper or apiarist is someone who keeps bees in order to collect their honey and other product that the hive produces that include beeswax, propolis, pollen and royal jelly to pollinate crops or to produce bees for sale to other beekeepers. A location where bees are kept is called an apiary or bee yard. Bee farmers aim to run profitable business enterprises based on the management of stocks of honey bees. Apiculture is a neglected source of livelihood which Nwali (1989) defines it as the rearing of honey bees in anticipation for acquiring financial benefits. Other scholars such as Ikediobi and Achobi (1985) and Morse (1989) also defines beekeeping in a similar way stating that it is an art of rearing, breeding and managing honey bee colonies in simulated hives for economic benefits or gain. Beekeeping is a livelihood strategy in developing countries and as it is stated in chapter 1, Ethiopia is one of the biggest producers of honey in Africa with estimated 44 000 tonnes of honey per annum. Lictaer (2007) is of the view that apiculture can be practiced as a supplementary source of revenue for farmers in communal societies and it can be executed as one of the poverty alleviating projects. Furthermore, apiculture is optimistic program that not only focuses on elevating the livelihoods of countryside communities but rather it also protects the environment and the planet's vegetation as a whole (Mazorodze, 2014). It is ecologically friendly, easy to practice it and the skill can transferred to the next generations. It also requires little capital and resources making it a more sustainable livelihood strategy.

2.2 What Is Household Food Security?

Smith et al (1992) indicated that food security is concept that have been established way back and many scholars who wrote literature and many explanations and theoretical models on household food security have been presented. According to Aoddinott (1992) there are approximately 200 definitions and 450 indicators of food security. FAO (1983) carried out an analysis which focused on food access which led to definition based on the balance between the demand and supply side of the food security equation, 'ensuring that all people at all times have both physical and economic access to basic food that they need'. Maxwell (1992) also observed that in Africa, food crisis that happened early 1971 stimulated a major concern on the part of international donor community regarding supply short falls created by production failures due to drought and desert encroachment. World Bank report (1986) further elaborate this concept of food security in the terms of access of all people all times to enough food for an active life.

According to FAO (1998) food security is achieved when all people, all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and health life. In this definition it outline all the pillars of food security which are availability, access and utilization of food. Therefore all these definitions will be focusing mainly on these pillars of food security. Baro (2002) argues that although all dimensions are important, the prevalent problem is the situation where households do not have access to the kind of food they need for nutrition and sustainable living. When food is available within an environment, households should have the purchasing power in order to access the food and utilize it.

Since 1970, food security issues were given considerable attention because of the population growth and continuous droughts. Food security starts at individual, household, national up to global levels. Moreover, it is of vital importance to note that food security at global level does not mean food security at national level. Likewise also food security at national level does not guarantee food security at individual and household levels. Feyeye and Ola (2007) argues that domestic polices in many developing countries have contributed marginally to food security especially in Africa and despite the global growing food production, hunger, malnutrition and famine are prevailing in many developing countries.

Taking from all the definitions above, an individual can conclude that food security per household level is when the household has access to the available food needed for a well-balanced diet for all family members. The food should be adequate in terms of quantity, quality, culturally acceptability and safe.

2.3 Factors Influencing Participation of rural Households in Apiculture

When Zimbabwe got its independence in 1980, it has been aiming to minimize poverty rate amongst the black majority who were previously marginalized. Despite of the efforts that has been put in place by government, the number of households who are living below the poverty datum line that is a dollar per day have been tremendously increasing. With this ongoing economic meltdown and changing of climate, seasons and increase in the frequency of droughts, this has greatly influenced people to think outside the box on ways of survival, and one of these survival strategies is beekeeping.

This idea of beekeeping as a way of poverty alleviation in Zimbabwe was brought into action in 1992 when Zimbabwe implemented the Economic Structural Adjustment Programs (ESAP) as way of consolation of the drought in 1991. Mazorodze (2014) states that in response to the drought situation, the Zimbabwean Women of Affairs, Gender and Community Development formed the Zimbabwe Farmers Development Trust (ZFDT) with the view to identify low cost projects of alleviating poverty. Having this background, apiculture is one of the project that was considered which requires minimum resources and have the potential to eradicate poverty.

Mazorodze (2014) also allude that the first project was then introduced in Zimbabwe way back and more than 20 districts have implemented it including Chirumhanzu district. In Zimbabwe beekeeping is a project which many people do not understand though when well established it will create employment opportunities and provide a breakthrough for household food security. Many areas in Zimbabwe requires honey not only for food consumption but for other purposes such as religious issues and as a medicine. In Zimbabwe, both man and woman take part in apiculture thus paving avenues of poverty reduction and increasing living standards of people through increased income per household level. There is huge potential for this sector through sustainable development and income generation from honey products. There is higher demand of honey in Zimbabwe which the current farmers are not meeting and this has resulted in importing honey from other countries to match demand despite the fact that we have forest and natural resources to boost our own apiculture industry. This also have influenced people to venture in apiculture because there is readily available market in Zimbabwe.

The world because of the economic meltdown and decrease in annual rainfall which has greatly affected agriculture, now needs survival strategies such as beekeeping which is neither affected by economy nor rainfall patterns. Ayansola (2012) observed that beekeeping will help to reduce the endemic poverty problems in Africa, especially in the rural communities. In other words, beekeeping which is an aspect of agriculture, scientifically called apiculture, is a self-reliance enterprise that will help to reduce the economic hardships, unemployment and other social vices (Ajao et al 2012).

FAO (2009) states that one that keeps people out of poverty is one that has access to a range of options. Therefore, apiculture and related trades can be sources of valuable strength for countless

number of people in the country side. Rather than just a hobby beekeeping may be seen as an important occupation for the majority of the rural people and part of rural life worldwide (FAO 2009). Hilmi (2011) states that by introducing beekeeping as a business and building own pre-existent skills will improve the knowledge and capacity of small scale farmers. Beekeeping offers employment opportunities and development for rural populace by making them self-reliant and depend less on the government, they can also be economically empowered through the various benefits derived from beekeeping (Oluwole 1999).

Farmers who practice apiculture in Zimbabwe especially in rural areas, their livelihood has been changed and a couple of benefits and outcomes have been witnessed. Villagers are also engaging in apiculture because the bees are also acting as pollinators in their fields and forests. Mazorodze (2014) state that the bee keepers and other people in rural communities use honey and bee wax to make secondary products such as candles. The products of bees when manufactured they produce better returns than raw products. Bees are also ecologically friendly, production is cheap and the knowledge and skills can be easily transferred from generation to generation using IKS thus why many villagers in Chirumhanzu are opting to venture in this project since no training is required from external people.

2.4 Trends of Beekeeping in developing countries

Few studies have managed to explore the contribution of apiculture to household food security in developing countries. The few studies were focusing mainly on the economic and social benefits derived from beekeeping. In Africa, they are many countries undertaking this livelihood strategy of beekeeping in order to sustain their economies. It has been mainly practiced in Tanzania, Ethiopia, and Nigeria just to mention a few.

Bradbear (2009) on the other hand concluded that beekeeping does not require expensive equipment, as simple hives can be made from local materials by local artisans. In Nigeria, using local resources, many households have engaged into this practice. Ajao and Oladimeji (2012) assessed the contribution of apicultural practices to household income and poverty alleviation in Kwara state of Nigeria. They highlighted that the average net return of honey produced per litre range from N1200 to N1500 while average income per season per colony ranges from N7500 to N 10000. Even through the study outlined valuable findings, it is however surprising that the

contribution of apiculture to household income was not explored. Moreover, Ajao et al (2012) outlined that households can survive and improve their living standards with the little income obtained from beekeeping.

Tanzania has been reported to hold large honeybee population and potential of honey production due to various ecological and climatic conditions (Goldenberg, 2004). High diversity of bee forage has been observed in different locations of the country (Chala, 2012). To date, over 9,2 million bee colonies are estimated in Tanzania with production potential of 138000 tonnes of honey and 9200 tonnes of bee wax per annum worth US\$345 and US\$368 million respectively (MNRT, 1998). Arumeru district is one of the potential beekeeping areas in Tanzania with an estimated production 1500 tonnes of honey per year (URT, 1998). It is also highlighted that the area is one of the dominant coffee growing areas in Tanzania and there are also several crops that attract and provide honey flora all year round. However, the majority of beekeepers are still employing traditional production systems and also limited with poor technical skills (Mustapha, 2000). Like many other scientific documentation that could be useful to guide sustainable beekeeping (Marcelian et al 2009) and therefore making its utility unrealized.

Conrad (2007) outlined that beekeeping does not require vast pieces of land, cultivated land, less capital is invested and the benefits are enjoyed despite the fact that it is smart agriculture. Bees have got different types and other species are solitary that is “mason bees” and various other rear there eggs in burrows and colonies (bumble bees). Wildman (2009) states that these various bees are capable of inter-breeding producing hybrid and they can quickly spread all over the world. Companies that breed bees have designed hybrids that are resistant to parasites, disease, good honey production, behavior reduction, swarming, mild deposition and prolific breeding. Wild honey is still harvested in Asia, Africa, South America and Australia and it is usually done by smoke subduing the bees.

Scoones (2010) outlined that in Zimbabwe, currently agriculture is contributing about 20% of the national’s GDP. After the underperforming and disastrous land reform program, the country has faced a massive decline in agriculture for the past decade. Scoones (2010) also state that besides land reform in Zimbabwe, the country was also affected by floods, continuous droughts, climate change and unstable political status that have hinder the investment and support from interested parties. With this background information about Zimbabwe, environmental Africa had to shed

more light in other surviving strategies rather than agriculture only and one of them is beekeeping. The NGO has implemented and initiated a plethora of apiculture projects in many districts of Zimbabwe such as Mwenezi, Makoni, Nyanga and Honde valley. Other districts such as Chirumhanzu later on engaged in the same project and now are also enjoying the benefits of beekeeping as a livelihood strategy.

2.5 The contribution of apiculture to Household Food Security in developing countries

Zimbabwe has been struggling to alleviate poverty since independency was attained in 1980. Despite of vast natural resources, many people in Zimbabwe area living below the poverty datum line which is a dollar a day. The idea of apiculture was introduced back in 1992 when Economic Structural adjustment programs (ESAP) was introduced after a massive drought of 1991. Beekeeping was then considered as project that needed less capital but had the potential to eradicate poverty.

Mazorodze (2014) states that the first apiculture project was in Hurungwe, Mashonaland West province. From there, they are many projects which were introduced in various districts of the countries including Chirimhanzu district. Despite the fact that beekeeping is not yet understood by many in the country, selling and marketing honey has improved the lives of many through creating job opportunities and income generation which has increased household food security. In Chirumhanzu honey is gathered from hives and is sold in local markets through either barter trade or by money thus having income and secure food for the family.

Generally, apiculture is done by both females and males thus paving way for poverty reduction through increased household income (Mazorodze 2014). If well managed, beekeeping will sustain households through food (honey) and increased income. Moreover, looking at the deficit of honey in Zimbabwe against the demand has caused Zimbabwe to import honey despite having natural forest and vast lands.

Beekeeping has turned to be one of the most lucrative opportunities being derived from the utilization of woodlands. This has come at a time when rural communities have been conscious of the need for sustainable utilization of biodiversity as well as sustainable environmental management practices. The vast natural resources that the rural areas of Zimbabwe are endowed with suggest that quite a number of opportunities can be derived from their management and utilization (Chazovachii, et al 2012). Beekeeping activities are integrated with conventional crop, livestock farming and agro-forestry. In a similar vein, beekeeping plays a significant role in contributing to food production through increased pollination of food crops and thus increasing household food. It also conserve forests and foster sustainable environmental management practices through the planting of bee forage and discouraging local communities from cutting down trees.

Through tree conservation and harnessing of honey, the households may also have access to fruits, medicines, poles, organic manure which can be of paramount importance in conservation farming and all these benefits play a critical role towards poverty alleviation as far as ecologically sustainable development is concerned in developing countries. As Joni (2004) notes, beekeeping plays a major role in the socio-economic development of rural livelihoods. It provides an important ecosystem service via pollination which contributes to the improvement of biodiversity by maintaining the genetic diversity of plants and maintenance of ecological balance.

Furtherance to that, beekeeping is argued to be space efficient and a suitable intervention strategy towards poverty alleviation in countries with little land for agricultural activities. Rwanda for instance helps demonstrate this fact. The country commonly referred to as a country of thousand hills has little land suitable for agriculture and today the scarcity of land remains a source of tension in Rwanda against the backdrop of rising poverty levels. In response to this, access to research for development and innovation program (ARDI) supported a number of traditional beekeepers to adopt modern beekeeping techniques to increases honey production and household food (Chala et al 2013)

In Zimbabwe, apiculture has become part of people's livelihood strategies, a couple of outcomes and benefits have been witnessed by many. Other benefits and outcomes are material goods, income and non-material benefits of contentment and well-being. Honey is also used as a remedy to many diseases and is also used as food for households. The manufacturing and other companies use bee wax and honey to make candles which is a secondary product. This has also contributed mainly to household income and food security since the secondary products generate more income than raw products. People's livelihood can also be strengthened by generating other bee products such as propolis, pollen and royal jelly which can be harvested and marketed to produce secondary products.

Best et al (1993) has the view that beekeeping attracts a sustainable livelihood approach that secure a visible dimension within the rural development. Beekeeping has proved to fit well in the talk of today that is sustainable development. This approach have managed to move rural development resource based interventions and economic challenges, towards human and their right and obligations to the resources that are locally available in their communities.

Kubari (2014) outlined that livelihood is a combination of assets, capabilities and activities which humans need for a living. Sustainable livelihood is reached when livelihood recover from and cope with the shocks and stresses and enhance its assets and capabilities now and in the future, whilst it is not undermining the local natural resources. Apiculture is very useful means for creating and strengthening people's livelihood since it creates and uses a range of various capital assets, successful beekeeping is achieved when all the livelihood assets are drawn together. Those assets look at all aspects of people and it will enhance the household food security.

2.6 The contribution of apiculture to household income in developing countries

In Zimbabwe, apiculture is mainly dominant in the eastern forestry parts of the country covering Honde Valley in Mutasa District. The farmers currently boast of a well-established honey market and the honey sold at this market is approved by the Standard Association Zimbabwe (SAZ). The local farmers rely on clay pots and wood made hives with each beehive producing about 15kg of honey on average and approximately 12kg once processed. Decanted into bottles of 500g this equates to 24 bottles and sold at a market price of \$4, a bottle produces an income of \$96 from this one beehive (Kubari, 2014). The input costs are relatively low being less than 50% of the income generated, making beekeeping a thriving business that can contribute invaluablely to a household

income in the backdrop of low agricultural productivity that has exposed rural households to extreme poverty. According to the Zimbabwean Independent (2014), rural poverty in Zimbabwe increased to 76% in 2014 from the 63% recorded in 2013. At the same time, cropping practices have failed to exorcise the specter of rural poverty that has troubled the nation for decades. Therefore, beekeeping as a livelihood strategy has the potential to increase food security and household income.

Tanzania has been reported to hold large honeybee population and potential of honey production due to various ecological and climatic conditions (De Pauw, 1984). High diversity of bee forage has been observed in different locations of the country (Chala, 2012). To date, over 9,2 million bee colonies are estimated in Tanzania with production potential of 138000 tonnes of honey and 9200 tonnes of bee wax per annum worth US\$345 and US\$368 million respectively (MNRT, 1998). Arumeru district is one of the potential beekeeping areas in Tanzania with an estimated production 1500 tonnes of honey per year (URT, 1998).

According to Azeez et al (2014), Ethiopia produces an estimated 44,000 tonnes of honey valued at US\$76.6 million and is the largest producer and exporter of honey in Africa. According to Lietaer (2007), beekeeping can be practised as an additional source of income for farmers in rural areas and has been successfully implemented in poverty-alleviating projects. On the same note, beekeeping is a positive programme that not only contributes to uplifting the livelihoods of rural communities but protects the trees and ultimately contributes to protecting our planet earth. In fact, beekeeping is ecological friendly, requires few resources to start up production, can be quickly taken up again after a crisis period and the necessary skills are easily transmitted from one generation to the other making it a sustainable livelihood strategy

Generally, honey production has been identified as one of the most lucrative enterprise in many parts of the world. For instance, more than 100 million kilogrammes of honey is produced each year in the United States of America. In Africa, beekeeping programmes are mainly dominant in countries like Tanzania, Kenya, Uganda, Zambia, Malawi and South Africa. In these countries, at least half of honey produced is consumed internally while some countries have surplus for export. Exported honey has boosted countries economy through foreign currency generation. In the

Nigerian context, Ayansola (2012) observed that beekeeping helps eradicate poverty especially in the rural communities.

2.7 Challenges in apiculture in sector

Despite the favourable natural environment existing in Zimbabwe, beekeeping often lacks the necessary capacitation at national level in form of financial and technical support that is required to fully exploit its great potential in conserving forests and natural ecosystems and in reducing poverty. Same is the case in Tanzania. According to Tanganyika (2014), Tanzania has over 2 million traditional artisanal beekeepers but they suffer from lack of modern equipment, training, finance and market. As a result, Tanzanian beekeeping is yet to meet its poverty alleviation potential.

Chala et al (2013) exposed that absence of proper beekeeping acquaintance and economic restraints are the most stimulating obstacles to apiculture at Arumeru in Tanzania. Village leaders in Arumeru stated they have not been visited by trained beekeepers or being asked to attend any workshops of apiculture for the past decade. In broad-spectrum, Tanzania have put in place a properly progressive policy and organized framework controlling development of apiculture and forestry (Milledge et al 2007). Nevertheless in reality, there is lack in implementation of these policies especially on beekeeping facilities in the country which has contributed to poor performing of this sector.

Goldenberg (2004) noted that droughts in the Tanzania have increased from once in a decade to once every two years and that they are likely to increase in occurrence and strength due to the effects of climate change. The periodic famines are related with shortage of suitable food and liquids for bees resulting in absconding and relocation of the colonies. This interprets to considerable losses to the bee farmers who may not gain any honey produce for a couple of seasons.

Gujarati et al (2014) also state that the other constrain to beekeeping is insecurity/ theft and vandalism. Although it is traditionally unusual and a taboo in many societies, theft of hives and honey has become a major problem in the country. In some cases, vandals and hooligans at times

use toxic chemicals to subdue the bees before take from them their honey, and in certain cases carrying the hives. This problematic issue is often linked with the increasing levels of poverty caused by unemployment, particularly amongst the youth. Methods of security against vandalism may prove to be costly since they may include building bee houses to protect the hives or capitalizing in extra measures to improve security.

2.8 Knowledge gap

The potential of beekeeping in developing countries is far too often not exploited in development programmes because the benefits of bees and beekeeping are not well known to stakeholders. Beekeeping information is found in abundance in most literature. However, most of the literature only alludes to the contribution of beekeeping to the economy of a country in developed countries. Very little knowledge is gathered by scholars on the contribution of apiculture to household income and food security. The purpose of this paper is therefore to provide farmers and stakeholders in the development sector with valuable evidence on how beekeeping, as an alternative livelihood strategy contributes towards rural income and food security. This study seeks to explore more and cover the gaps not well addressed by other scholars who focused in other importance of beekeeping. It will also provide useful information to forestry stakeholders with the necessary information and motivation to consider apiculture as a national and protective activity that should always be considered and integrated in national forest programmes and in other development programmes such as poverty reduction strategies. In a wider sense, the study helps in the formulation of policies that would go a long way to improve not only rural income but alleviate poverty in the economy at large. These policies would also facilitate a reduction in the import bill of honey in Zimbabwe as 60% of the honey consumed in this country is imported. With information from researches of this nature, Zimbabwe may also increase honey production and probably start exporting to other countries.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

The research design is a logical structure of the research whose function is to ensure that the data obtained enables the researcher to answer the research problems as clear as possible (Bruce, 2007). This study used a mixed research design which included both qualitative and quantitative research dimensions. Triangulation helped the researcher to have a detailed analysis of the research problem. Qualitative research gave room for the researcher to grasp a clear understanding of people's opinions and views about apiculture and household food security. Reality is subjective therefore the researcher will focus on the insider viewpoint. Qualitative data will be obtained using questionnaires (open ended questions), interviews and observations using a checklist.

Key (1997) has a view that quantitative research model is based on the principle that social phenomena can be measured, quantified and expressed numerically, thus making the data available to be analyzed by various statistical methods. Quantitative research encompasses the measuring and counting of event such as the frequency of harvesting honey per household. Quantitative research was also used to gather data on the average income received by every household per harvest or annually and how the income is used to eradicate poverty in Ward 20. This research design adopted is vital to this study since it helped to describe structures of the society that cannot be observed directly such as the changes in consumption patterns of food before and after the introduction of bee keeping.

3.2 Target Population

Target population is the group of elements or people to which the researcher wants to make interference (Fricker, 2006). The target population for this study include Allied Timber Project manager and households which are engaged in bee keeping, Forestry Commission Officer, councillor and Agritex Officer. The households provided sufficient information to compare the level of household food security between them and also to analyze the contribution of apiculture to household food security. Allied Timber project manager was targeted so as to give adequate information on how the project started and how it is contributing to household food security in Ward 20. This will help to achieve the second objective of the study of assessing the ways and extent in which bee keeping enhance household food security. The Forestry Commission Officer was selected since she is the one with the mandate to conserve the environment where the project

is being done. She was also selected to outline the problems which apiculture is causing to the environment. Agritex Officer was targeted since he was the one who had records of quantities of honey and other farm produce which were necessary for the research. The Ward councillor as the coordinator of all developmental projects in the area was also selected to explain the progress of the project as well as constraints being faced in apiculture as highlighted by the last objective.

3.3 Sampling procedures

Research sample refers to the participants found in the study area from whom data is to be collected. Frey et al (2000) define a sample as a sub-group of a population. A sample should be a true representation of the whole population in the study area. The total number of participants in the apiculture project is fifty members. Therefore, a census of households involved in apiculture in Mtao forests was carried out (Table 3.1). A census was carried out because (Cochran 1953) indicated that if the population is less than 100 there is no need for sampling in order to obtain relevant results. Cochran (1953) points out that using correct sampling methods allows researchers the ability to reduce research costs, conduct research more effectively and provides greater accuracy in selecting the households. This sample clarifies and determines the characteristics of participating household in Rukweza village. Census involves every participant to explain his/her ideas which helped in compiling adequate information about the topic under study. It also eliminates biases and covers all angles of the research. For the Project officer from Allied Timber, Forest Commission Officer, councillor and Agritex Officer (Table 3.1) the researcher used purposive sampling in interviewing them so as to ensure transparency and to get the needed information.

Table 3.1 sample size and selection

section	Target population	Sample size	Percentage of sample	Sampling method
Households doing apiculture	50	50	100	census
Forest Commission Officer	1	1	100	Purposive sampling
Allied timbers Officer	1	1	100	Purposive sampling
Agritex Extension worker	1	1	100	Purposive sampling
Councilor	1	1	100	Purposive sampling

3.4 Research Instruments

3.4.1 Questionnaires

The researcher used a questionnaire in collecting data from the households who are practicing in apiculture project in Ward 20. The questionnaires contained both open-ended questions and closed ended questions. Closed ended questions was used so as to avoid long answers which are not necessary to the study. Whilst open ended questions also provided vast information on the subject of concern. Open ended questions also allowed the respondents to express themselves and formulate their own answers. Some of the questions in the questionnaire had optional answers so as to make it easy for the people to answer the questions for instance (yes or no). The questionnaire was structured in English and translated into local languages to the respondents and the researcher was present so as to clarify issues using vernacular to the respondents and also to explain where they were not understanding and for easy communication. Households in Chirumanzu Ward 20 speak Shona which the researcher is also familiar with so it was much easier to interpret questions to them. The researcher preferred questionnaires since its geographical coverage is much greater without incurring the additional cost of time and travel. The questionnaire had four sections which

were determined by the objectives of the study. The first section was personal information about the respondents and the last three were focusing on objectives. Since the participants were located in one village, the researcher had to drop and pick the questionnaires where participants were busy or unavailable and sometimes had to wait and help the respondents answering questions. The questionnaires were very useful particularly for this research in ward 20 which has dispersal population in nature and it had wide coverage.

3.4.2 Interviews

According to Odendahl and Shaw (2000) interviewing is a conversation with a purpose. The researcher used semi-structured interviews which were conducted face to face with the Allied Timber's project manager, Forestry Commission Officer, Councilor and Agritex Officer. The researcher made appointments with these officers so as to give them enough time to prepare for the questions and also to avoid unproductive endeavours in the event that they were absent. The interview was also recorded using an audio device so as to capture all the information which they presented to the researcher. This was done in order to capture accurate information and not to miss a single word which might be necessary for the study. The researcher also jot down some of the answers during the interviews. The researcher used semi-structured interviews which were guided by a template and this allowed complex questions to be well explained to the interviewee. The interview also gave room for both the researcher and the interviewee to interact since the respondent will not be writing answers down as what questionnaire respondents do and the researcher was not confined to the template.

3.4.3 Field Observations

The researcher used direct observations to identify quantity of honey which is to be harvested by each household and its quality. Whenever the researcher come across what was useful to the study he used camera to capture the observed things. Observations were used to identify general appearance of household members of Ward 20. For example, in order to know the level of food security on household level, the researcher observed the infant's health or outwards appearance, since it is more apparent in children if they are malnourished. Lofland (1995) postulates that direct observation refers to data which can be collected by an external observer. Observations are very flexible and they do not necessarily need to be designed around a hypothesis. Field observation helped the researcher to have a clear picture of what is on the ground and it allowed the researcher to have notes and photographs where it was necessary. The researcher used an observation

checklist where the observer had to tick whenever he observes a phenomenon valid to the research. The checklist contained apiary, bees, method of harvesting honey, how honey is packed for market etc.

3.5 Ethical Considerations

There are various ethical considerations which need to be taken note of by the researcher before, during and after the study. The researcher first seek permission to conduct the field research in Chirumhanzu Ward 20 and this permission was granted by the District Administrator. The researcher also seek permission from the relevant authorities in the area such as the Chief, headman, councillor, village head as well as the Zimbabwe Republic Police (ZRP). When developing data collection techniques, the researcher had to take into consideration the physical, emotional or social harm which will be likely to be caused and find possible solutions to them (Chaleunvong, 2009). Besides having all the procedures in mind, the researcher sought consent of each participant before initiating the research. However, during the research harm can be caused, for instance, by disrespecting information rights to privacy through posturing sensitive questions or by acquisition access to their records which may contain personal information. Observing informant's behaviour without their concern (concealed observation will always be crosschecked or discussed with other researcher in respect to ethical tolerability), allowing personal information to be made public which informants would want to be kept private, failing to observe certain cultural values, traditions or taboos valued by the informants. Therefore, in this context, the researcher observed all the ethical elements of the research.

During the research, the respondent will sign the consent form which will indicate their willingness to take part in the research. After signing, the respondents will be freely and comfortably answer questions. The signed consent will be kept into a separate box from the secretly completed questionnaires so as to ensure anonymity. In this case no signed agreement form will be linked to any of the completed questionnaires.

3.5 Data Analysis and Presentation

The researcher used SPSS which refers to Statistical Product Service Solution to analyze quantitative data. All the gathered information was entered in SPSS version 20 using a laptop. This electronic package was used to create pie charts, graphs and charts using descriptive, frequency and crosstabs. When analyzing data using SPSS there is need for entering data and all variables collected and create a worksheet. String options and numeric was used to code all responses. Some

of the variables which were collected and coded was gender, age, household size, income and meals per day by households. These variables were analyzed using SPSS and presented in graphs and charts using Microsoft Excel for clear presentation of data. The data was also analyzed using descriptive statistics which generated percentages and respondent's statistics. The research used SPSS and Microsoft Excel since it made it simple to create charts and graphs using analyzed data. SPSS will also generate percentages and variables which will be vital when creating graphs and charts using Microsoft Excel Package. All the information and research findings of beekeeping, income flows and methods of harvesting honey were presented using graphs, tables, charts and percentages. These statistics were also explained below every diagram, table or figure to outline the significance of it. The Chi-square tests which were conducted on the association between frequency of harvest and quantity of honey to be harvested by each household participating in apiculture activity. Data from interviews and questionnaires was analyzed combined with field observations using tables and graphs so as to come up with concrete information about apiculture in Chirumhanzu district, Ward 20. Pictures from field observations were used to explain variables where it was necessary.

CHAPTER 4: RESULTS AND DISCUSSION

4.1 Socio-Demographic Information of households

4.1.1 Gender of households respondents

The research indicated that 70% of the households who are undertaking apiculture project are males and 30% are females. This is so because in Ward 20 apiculture has become a source of living, creating job opportunities for males who are the bread winners. Most of the man who are doing apiculture do it for income generation to sustain their families. Thirty percent (30%) of the questionnaire respondents were women who do beekeeping as a livelihood strategy and also as a source of food to improve household nutrition. During an interview the Forester revealed that most man in Ward 20 are unemployed therefore they seek self-employment in apiculture.

4.1.2 Age of Respondents

Figure 4.1 shows age groups of people who are participating in beekeeping. The highest estimated number of respondents are in the age group 35-44, which is, 56% of the 50 people who are participating in apiculture project. This age group is the most active group who should take care of their families by providing them with the basic needs therefore they are engaging in beekeeping as a way of income generation for the family (United Nations 1946). The questionnaire respondents also revealed that this age group uses income from apiculture for fees and to buy food for their families. Age group above 45years had the least number of participants (8%) which indicated that most of the elderly people are now majoring in other food security activities such as crop production and animal husbandry which is popular in Ward 20. The age respondents also indicated that the population of Chirumhanzu ward 20 is a young and economically active population.

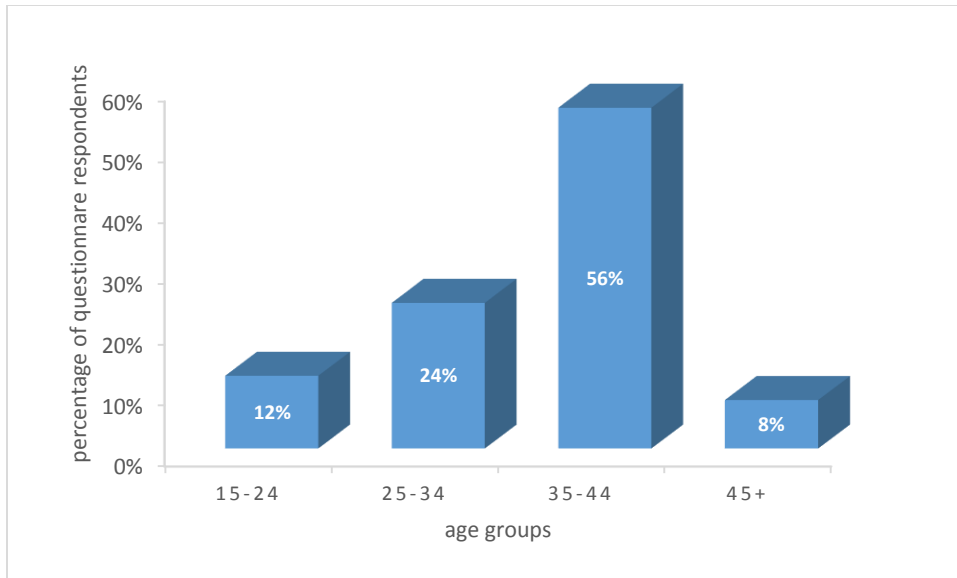


Figure 4.1 Age of respondent

4.1.3 Marital status of respondents

Figure 4.2 shows that married people in Ward 20 are more involved in apiculture project with 68%. The questionnaire respondents outlined that those who are married are taking beekeeping project seriously because they have families to look after in terms of food, fees and every households needs. Figure 4.2 also shows that the least number of people who are practicing beekeeping are those who are divorced with 12%. As it was revealed by half of questionnaire respondents that those without big families or rather without extended families are not very eager to do apiculture because they are able to sustain their small families from the little that they get from their fields. The difference in participation also revealed that the population of ward 20 has very few who are divorced because the households are still in their youthful stage and they are in the early stages of their marriages. Single respondents also had relatively low participation of 20% which was supported by the interview of the councillor who revealed that those who participate in beekeeping are those with burdens in their shoulders and are looking for income generation projects. From the 20% the researcher also observed that many of the people are youths and orphans who are sustaining themselves, therefore they have engaged them in beekeeping project as a way of alleviating poverty and a way of improving their living standards.

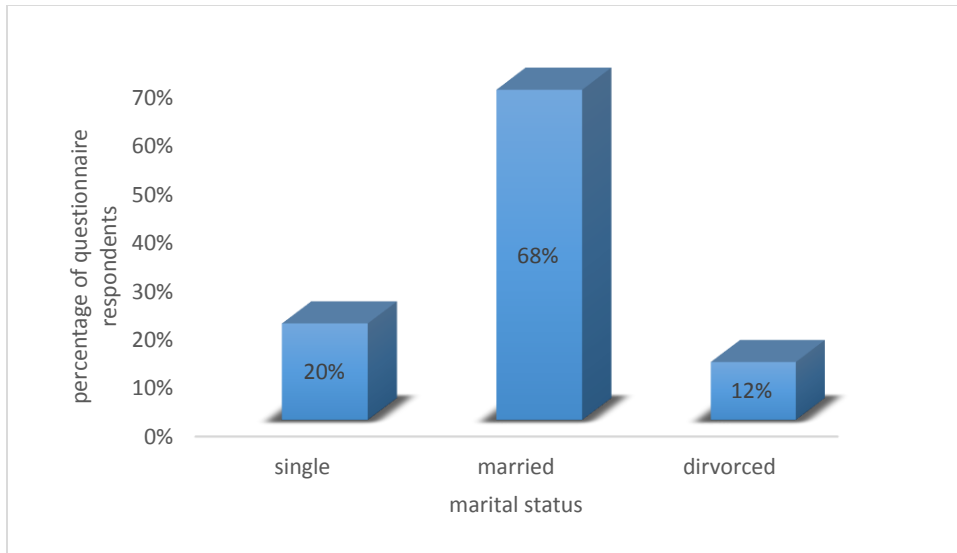


Figure 4.2 Marital status of questionnaire respondents.

4.1.4 Level of education

Figure 4.3 shows the level of education of households participating in apiculture in ward 20 Chirumanzu district. 80% of the households who are doing apiculture have reached secondary level. This shows that people in Chirumanzu are literate and this was supported by the number of observed schools in the district which was high. However, most of these people who are participating in apiculture are school drop outs or could have finished school at Ordinary level but could not have managed to get a minimum of five subjects to be recognized as employable or to be able to proceed to Advanced level. The cause of a school dropout highlighted by the respondents was financial hardships which caused male students in particular to venture into apiculture after secondary level of education. The percentage of respondents who attended primary level and tertiary level is 20% that is 10% each. Very few could not go for secondary level as highlighted by 10% above and this was caused by the death of parents and financial hardship as highlighted by questionnaire respondents. Moreover, very few would reach tertiary level because the grades at secondary level were not permitting them to do so. Those who have reached tertiary levels are mainly workers of Allied timbers and other government departments who are also part of beekeeping project. These people are not from Ward 20 but they are there because of work and due to the availability of resources that is bees and the forest they have engaged in beekeeping as a hobby.

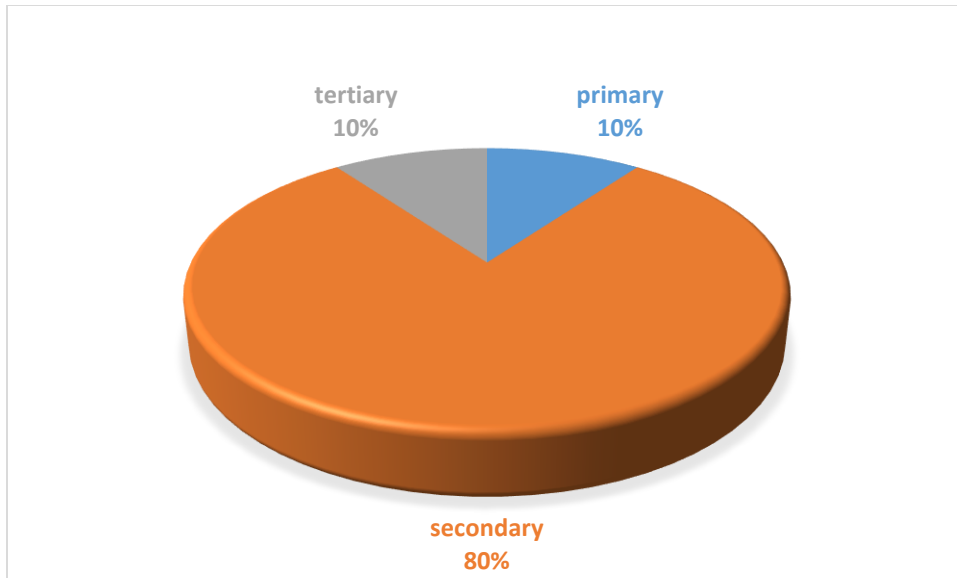


Figure 4.3 level of education of questionnaire respondents

4.1.5 Employment levels of respondents

The majority of the people in Ward 20 are not employed as indicated by 78% of questionnaire respondents. The respondents revealed that this is due to the poor performing economy of Zimbabwe which have resulted in closure of industries therefore the only survival strategy for them is apiculture. Ten percent (10%) of the questionnaire respondents also revealed that beekeeping has employed them through hive making, security guards and honey processing and they are now getting income from it. Twenty two percent (22%) of the employed questionnaire respondents are basically doing low class jobs such as cleaning and timber processing at Allied Timbers. However beekeeping has created job opportunities for other people in ward 20 since some have become middlemen for honey, hive makers, beekeepers and bee suite makers.

4.2 Major Factors Influencing Participation of Households in Apiculture

Fig 4.5 shows the major factors which are influencing households to engage in beekeeping. These factors include income and food that they get from bee products, the availability of bees and the forest in Ward 20 and the medicine that they get from honey as well as doing beekeeping as a hobby. As indicated by in figure 4.5, income and food have 62% questionnaire respondents which shows that beekeeping in ward 20 have become a major source of income and food for the participating household and as it is shown in figure 4.4 that they are now food secure having at least two or more meals a day.

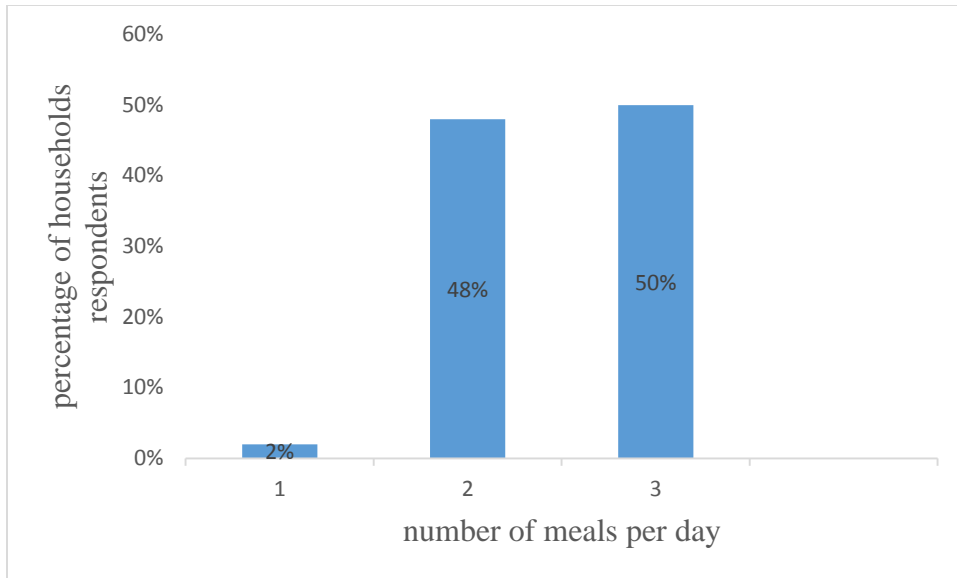


Figure 4.4 Meals per day at different households

The questionnaire respondents (93%) also highlighted that they use the income that they get from apiculture to pay school fees and to buy other goods necessary in their homes. The Forester during an interview also stated that the income from apiculture is used to buy agriculture inputs and also as savings for the family. She also said she uses the honey at the exhibition shows and major events of the district as goodwill to the invited guests. Twenty percent (20%) of the questionnaire respondents outlined that the factors that drive them to participate in beekeeping are what they get from honey products that is medicine and improved health diet. Honey is used as a medicine for diabetes, flue cough and asthma (Ajao 2012). The questionnaire respondents highlighted that honey can treat these diseases since it is made from natural herbs and nectar. Ten percent (10%) of questionnaire respondents outlined that they just embark in beekeeping not for income generation, search of food nor medicine but rather as a hobby to enjoy the God given natural bees and their products. Figure 4.5 shows that 18% are those who have engaged in apiculture because of the availability of a well-protected forest called Mtao Forest. The bees are attracted by the flowers from the eucalyptus trees and the nectar to produce the honey. With these eucalyptus tree and vast of other types of indigenous trees, the bees are found everywhere and it does not take a month for a hive to be occupied as highlighted by the manager from Allied Timber during an interview.

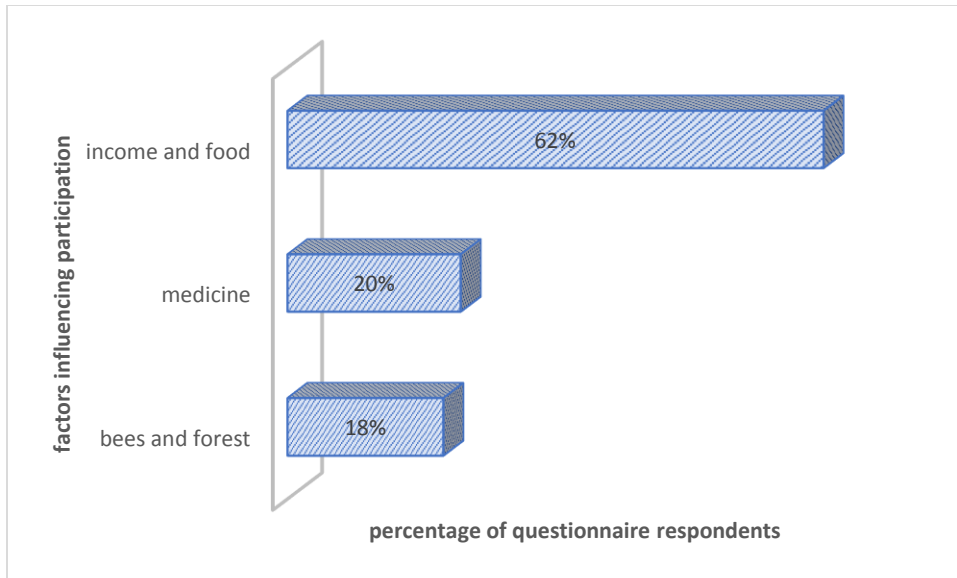


Figure 4.5 Factors influencing households participation in apiculture

4.2.1 Period in apiculture and harvested honey

The research findings shows that many bee farmers in Ward 20 have engaged in beekeeping for more than five years. Fig 4.6 shows that those who have two (2) years in beekeeping are very few with just 14%. Many people who have lived in the area for a long time have realized the importance of the forest resources and utilized them to their own benefits. Figure 4.6 further shows that 68% of the participants have engaged in beekeeping for more than five years.

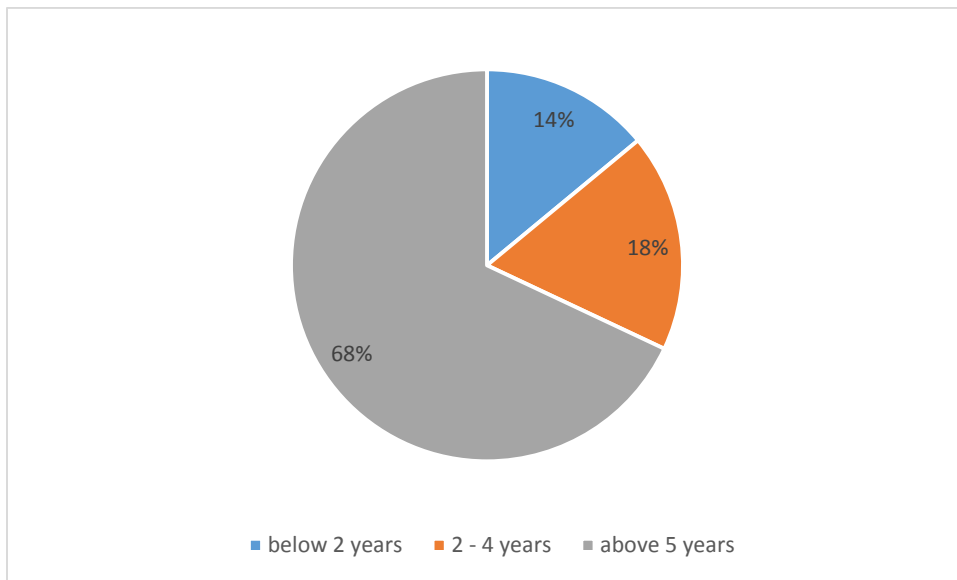


Figure 4.6 Period households engaged in apiculture.

Chi-square test results (Table 4.1) showed that there is significant association between the period households have been engaged in apiculture and amount of honey harvested ($p= 0.003$). This shows that those who have engaged in apiculture for a longtime that is five years and above are harvesting more than those who are still new to the project. This is because of lack of experience and knowledge on how to be a beekeeper. Those who have engaged in apiculture for a long time uses indigenous knowledge like harvesting at night and other cultural methods to increase their harvest.

Table 4.1 Chi-square test results of period in apiculture and harvested honey

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.268 ^a	6	.003
Likelihood Ratio	16.542	6	.001
Linear-by-Linear Association	7.491	1	.000
N of Valid Cases	50		

Honey is harvested as raw honey using buckets. As indicated by table 4.2, the average amount of honey harvested by each household per year is 660kg. This amount is achieved by the farmers because of the number of times they harvest and the number of hives they harvest. As indicated by Agritex officer and proved by chi-square test results (Table 4.1) that there is a strong association between period household have been engaged in apiculture and the amount of honey harvested, those who have engaged in apiculture for than five years have many hives and are producing more honey.

Table 4.2 Amount of honey harvested per household level

Harvested honey	minimum	average	Maximum
Quantity of honey	108kg	660kg	1320kg

Figure 4.7 show that 42% of questionnaire respondents are harvesting more than 500kgs of raw honey per annum. Since beekeeping is done as a hobby and a livelihood strategy, households have mounted many hives which they harvest twice or thrice every year. When harvesting, one hive can produce up to 25kgs of raw honey each time a farmer harvests. Thirty two percent (32%) of questionnaire respondents are harvesting more than 100kg but below 500kg which is sustaining them and improving their living standards. Agritex officer stated that farmers usually harvest more than 1000kg per annum but this year they were affected by the heavy rains that is why they have produced less. As shown by figure 4.7 that only 24% managed to harvest more than 1000kg of honey per annum. This was achieved by those farmers who had many hives (50+ hives). Only 2% of the questionnaire respondents are harvesting below 100kg. These respondents highlighted that they are new to the project and they have few hives as compared to their counterparts.

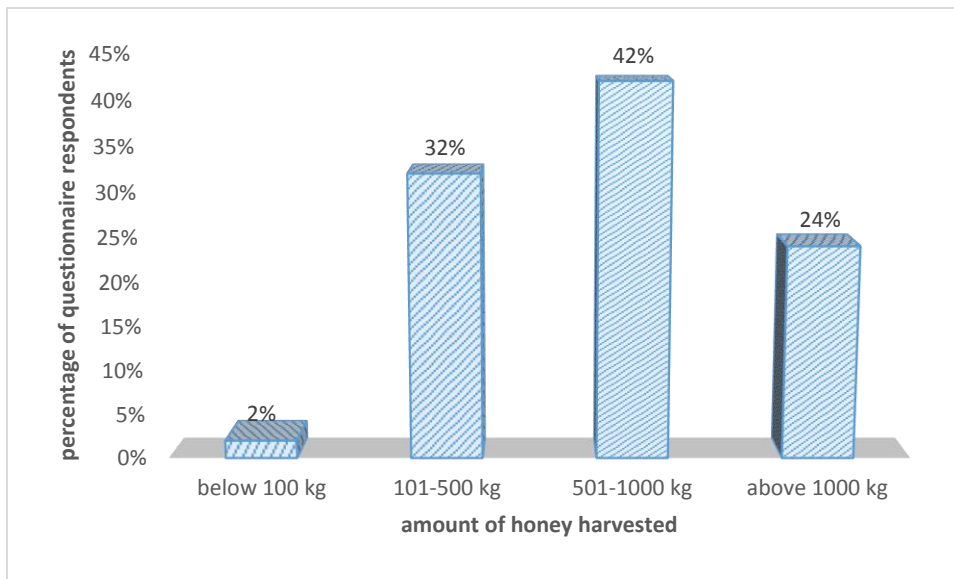


Figure 4.7 Amount of honey per household annually

4.2.2 Harvesting times

Fifty eight percent (58%) of the participating bee farmers responded that they are harvesting three times a year. The participants revealed that they harvest thrice because the bees are producing honey so well and they went on to say if you do not harvest in stipulated times the bees feed on the honey and the farmers will not harvest anything. One of the villagers who is a bee farmer also outlined that if you do not harvest your honey, the bees will not work or even produce more honey

but if you harvest they will quickly fill in the gaps and produce more honey combs. The remaining 42% are those who harvest twice every year. Moreover, these respondents revealed that they harvest two times so as to leave the bees with something to feed on and also for them not to abscond. The experienced bee farmers use bee wax to attract bees in new hives and to reduce absconding (Fricker 2006).

Using Chi-square test results showed that there is a significant association between the number of harvesting times and the quantity of honey harvested ($p=0.002$) (Table 4.3). Those who are harvesting more times that is thrice are harvesting more than their counterpart who harvest twice a year.

Table 4.3 Chi-square test results of frequency in harvesting and harvested honey

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.235 ^a	3	.002
Likelihood Ratio	5.970	3	.000
Linear-by-Linear Association	3.862	1	.000
N of Valid Cases	50		

4.2.3 Equipment used in beekeeping

Ninety percent (90%) of the questionnaire respondents use equipment in beekeeping whereas 10% do not use equipment. Those who do not use equipment highlighted that they usually harvest or visit their hives during the night whilst the bees are resting and the bees cannot see during the night therefore there is no need to use any equipment. From the 10% almost half of them outlined that they harvest any time of the day but they use cultural methods which they did not disclose to the researcher therefore no equipment is required. For the 90% questionnaire respondents who revealed that they use equipment normally use cow dung, smoker and bee suit.

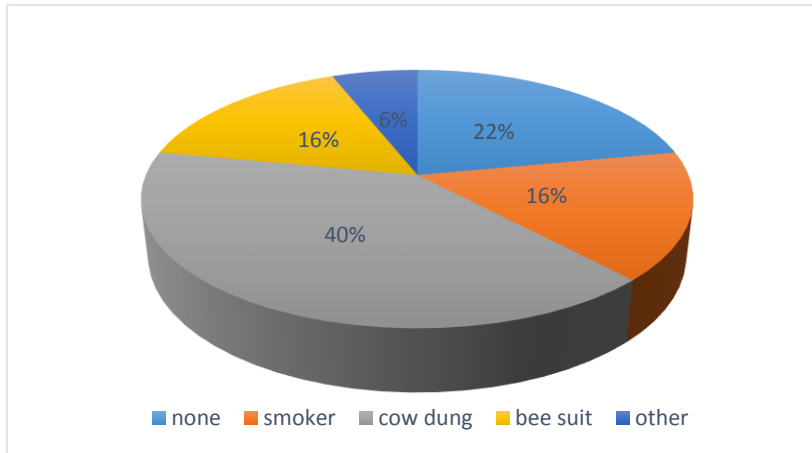


Figure 4.8 Equipment used in beekeeping.

Forty percent (40%) of the respondents use cow dung in harvesting honey because it is readily available from their kraals. Cow dung is used to drug the bees for a while when the beekeeper is harvesting. Twenty two percent (22%) of the questionnaire respondents indicated that they use IKS in harvesting and bee management which they get from other beekeepers and elderly people. As shown by figure 4.8, questionnaire respondents (6%) indicate that they use other equipment such as fire and chemicals which are dangerous and not environmentally friendly. The researcher through observation concluded that those who have experience in beekeeping have no need of equipment except the available cow dung since bees are human friendly and that does not affect their harvest.

4.2.4 Marketing of honey and value addition

The harvested honey is sold either to the local market or to middlemen. The local market constitute local people who are not bee farmers, other farmers and travellers along Masvingo road. The middlemen who are found in Ward 20 are the business dealers who have shops in Masvingo and Mvuma. There are also other people who act as middlemen for instance the Forester produce honey and also buys honey from other farmers. She revealed that in an interview that she buys honey from farmers and sell it to the buyers who come as far as Harare. Moreover during an interview allied timber manager also revealed that they also act as middlemen that is they buy honey from the farmers and they sell it to buyers from South Africa who are attracted by the eucalyptus flavor

of honey which is produced in ward 20. Allied timbers have a machine which they use to refine honey thus value addition which will increase the overall profits. Raw honey costs about \$5 per kg but refined honey costs about \$4 per 500g. Many farmers sell raw honey because they do not have the extracting machine thus enjoying little profits from honey. Generally as shown by the respondents, 72% are selling their honey to the local people and 28% to the middlemen.

4.2.5 Management practices

In beekeeping there are management practices which are done so as to increase the harvest. These management practices include apiary inspection and management, division and swarm control as well as feeding and pest control. The questionnaire respondents (72%) highlighted that they usually use one management practices which is apiary inspection and management shown by table 4.4. Division and swarm control, feeding and pest control have 14% and 20% respectively showing that they are of less importance in beekeeping. Agritex officer during an interview outlined that the swarm controls itself and select another queen whenever the swarm is bigger and cannot fit in the hive. Ogaba (2007) highlighted that the bees feed themselves from the natural environment, flowers water and sugar found within the forest and the surrounding households.

Table 4.4 Management practices in apiculture

Management practice	Frequency	Percent
Inspection and apiary management	36	72.0
Division and swarm control	3	6.0
Feeding and pest control	10	20.0

4.2.6 Other sources of food and income generation

Fifty six percent (56%) of the people who are participating in apiculture in Chirumanzu Ward 20 are into crop production. This was explained by the Forester during an interview highlighting that the farmers grow maize, sunflower and other grains because the bees will help them in pollination. Field results shows that 18% of the questionnaire respondents are engaged in poultry which is a quick profit making business. For one to be recognized as a mother should have chickens around her homestead as alluded by other respondents (Ojo 2004). Ten percent (10%) are not doing any agricultural activities because the area that they live is affected by baboons therefore no meaningful agricultural activities can be done. The Forester outlined that agriculture is not easy to do when you are close to the mountain and the forest because of these wild animals. For food and income generation they depend upon apiculture and some of them are the working class as outlined in section 4.1.5. Many respondents indicated that they were doing both crop production and animal husbandry at a small scale to supplement the income that they get from apiculture and to provide nectar for their bees.

4.3 The contribution of apiculture to household income

All the questionnaire respondents who were given questionnaires revealed that they are having income from beekeeping. The researcher also observed that with the harvest that they produce each year, each household can have an average of \$1200 per annum. The income which the bee farmers are producing from honey is used to pay school fees and savings. Moreover, 60% households are using the money to pay fees for their children and the 20% indicated that they are raising orphans with the income they get from honey. Thirty eight percent (38%) of questionnaire respondents outlined that they use the money for their savings. The savings as highlighted by the Ward councillor are used to pay hospital bills, transport and day to day errands within the family. During an interview, Agritex officer stated that bee farmers are using the money to have basic needs in the house such as agricultural inputs, food and clothes. During an interview the Forester said she is now able to buy things such as toys for her kids which she could not buy before engaging in apiculture. Therefore, with the above information it shows that apiculture is enhancing household income and increasing their living standards (Qaiser et al 2013)

4.3.1 The contributing of apiculture to household food security

4.3.2 Apiculture contributing to food availability

Ninety- three percent (93%) of the questionnaire respondents highlighted that beekeeping do contribute to household food availability that is directly or indirectly. The honey which is harvested is used as food by most of the households since they highlighted that it improves their nutrition and diet. Households who used to have one meal a day indicated that they have changed because of beekeeping to at least two meals a day and others three meals a day as indicated by figure 4.4. Besides eating honey they also sell it to the local and middlemen. This has boosted the availability of food in the area since they are now able to buy goods and food stuffs such as bread and cooking oil amongst others as it was alluded by questionnaire respondents. They also revealed that since they harvest twice or more per year they will never be food insecure unless the project is affected by other constraints such as pests and theft. Moreover, local business dealers also made sure that there is food (both basic and luxurious goods) in their shops so as to make sure that food is available for the people in Rukweza. The 7% of people who are not benefiting from apiculture and enjoying the profits thereof are those who are new to the project and they were arguing that the project needs experience and knowledge especially in positioning of hives and times of harvest. Many who harvested honey during wrong times they did not harvest much since the bees were not yet producing honey but rather having brood (eggs) (CIA 2006).

4.3.3 Apiculture contributing to food access

According to Ebojei (2007), households who are benefiting from apiculture in Kwara State in Nigeria are those who have access to honey. This statement also corresponds to the 85% of questionnaire respondents who also highlighted that they have access to food since they are participating in apiculture. The food may be available but people might not be able to access it. In Rukweza village, 60% respondents outlined that indirectly they are able to access food from the local growth point using income generated from beekeeping. Allied timber manager during an interview stated that before the project was introduced in Ward 20, shops were very few and people used to depend on natural food from the forest and from their fields but now they have sufficient resources in terms of income from honey and its products to travel to Masvingo and Mvuma to purchase food for their families. For those who are not harvesting enough honey because of the number of hives that they have, they are barter trading using maize, goats and chickens. According to Riely et al (1995) access normally depends on the distribution of money /income within every

household, food prices, availability of income to households and other factors influencing individual access to social, institutional entitlements and market. This therefore outlines why the other 15% of respondents to have no access food. The food prices in Rukweza are relatively higher than in Masvingo causing the local people fail to afford the food even if it is available

4.3.4 Apiculture contribution to utilization

The results showed that 78% of households confirmed that beekeeping is contributing to food utilization in their families. However, 22% had different view saying beekeeping is not contributing to food utilization. This was because the households were not only focusing on buying food for the family but they highlighted that the money they get from apiculture is used to pay hospital bills and other necessities within a family. The researcher also found out that apiculture is not only helping in food security but it is improving the living standards of people in ward 20 as well as stabilizing their economic status in the area. Riely etal (1995) states that utilization have a biological and socio economic aspects. Despite the challenges outlined by the bee farmers, the Forester and Allied timber manager confirmed that beekeeping will continue to sustain farmers and contribute to household income and food security because of the witnessed results enjoyed at the moment. They also stated that because of the availability of the forest, bees and human labour, soon it will be a hobby for all villagers to engage in apiculture. However, not forgetting the fact that the fields are not producing enough food to sustain households because of poor soils and climate change, therefore villagers are preferring beekeeping since it is not affected by the above mentioned problems. The Ward councillor also highlighted during an interview that apiculture is one of the surviving strategies as it is indicated by ZIMASSET on the agenda of empowering people to have their own businesses, therefore it will help many people in ward 20 with the available resources.

4.4 Challenges encountered in beekeeping activities which may compromise its sustainability as a livelihood strategy.

The constraints to sustainable beekeeping which are being encountered in ward 20 by farmers are pest, theft, financial constraints and veld fires as well climate change. Figure 4.9 shows these challenges. The major challenge which is affecting bee farmers is climate change as indicated by 30% of household respondents. The questionnaire respondents outlined that the bees were affected by excessive heat and heavy rains in 2016 and the hives were flooding with rains this year 2017 which has resulted in absconding and death of some bees. The Forester during an interview

outlined that the hives which are used in Ward 20 such as the box, log hive and tin are largely affected by water during rain seasons. The other common challenge is financial resources and 26% of the questionnaire respondents revealed that they do not have capital to do bee keeping at maximum production. Morse (1989) states that the standards hives which are required to increase production are langstroth, Kenyan top bar hive and box hives which are very expensive to purchase. The farmers also highlighted that one langstroth hive cost \$165.00 and they are not able to buy it resulting in the use of traditional hives. Twenty percent (20%) of the questionnaire respondents outlined that they are affected by theft. The hives and honey during harvesting times are stolen by the villagers causing a great loss to the bee farmers. The respondents also revealed that pest and diseases (16%) affects the production of honey in Mvuma. Pests such as pseudo scorpion, bee wasp, lukewarm, laptosight and badger affects flowers and bees resulting low quality and quantity of honey produced (Steinberg 2000). The manager of Allied Timbers also highlighted that the honey which is produced in ward 20 is produced from eucalyptus flowers thus having the eucalyptus flavor which is different from honey produce from other flowers. Therefore, when the flowers are affected by pest the quality is compromised (Ashfaq 2006). The honey which is produced from eucalyptus flowers is light in colour (Abram 2007) and it is preferred by most buyers especially from South Africa whereas the honey which is produced from local indigenous trees is dark in color. 8% of the questionnaire respondents are being affected by fire. The fire is also caused by other farmers who harvest using fire and smoke ending up destroying the whole forest and the hives if it not controlled in time.

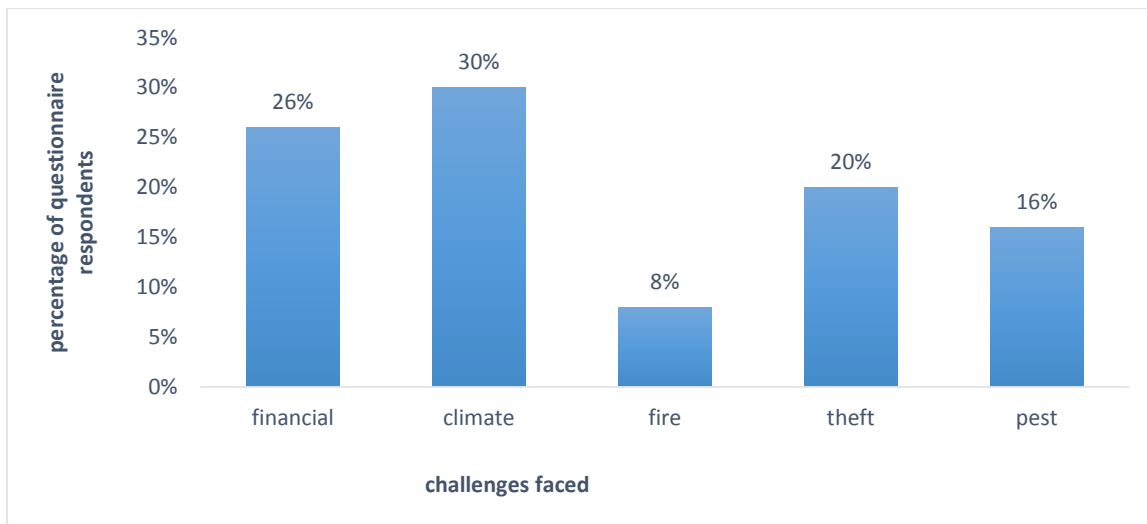


Figure 4.9 Challenges faced in beekeeping.

4.4.1 Proposals to enhance sustainability of apiculture in Ward 20, Chirumhanzu District

Respondents had many suggestions to solve the problems that they face in beekeeping and some of these solution were fire guards, pest control, security guards and building bee houses. Ten (10%) of households respondents proposed that fire guards can be put around the forest so as to protect it from veld fire. Sene (2000) highlighted the issue of theft as a problem to the rural communities but the household respondents outlined there is need to have security guards who will have frequent patrols around the Mtao forest to check for thieves and hooligans. Moreover, 90% of the respondents were saying bee house is the way to go. Bee house (Plate 4.1) will reduce the effects of heavy rains, theft and pests which affects bees in other bee hives. Bee house will also reduce the number of hives which will be scattered in the forest but will accommodate more bees producing honey in different swarms (Thomas et al 2000).



Plate 4.1 Bee house in Mtao forest, Mvuma

Bee farmers also requires financial assistance from the government in buying the hives and bee suits (World bank 1986). The hives are very expensive to the farmers thus affecting the production of honey in ward 20 whereas if they could have loans they would produce more to meet demand in the country. Allied Timbers manager outlined that the quality of honey which is produced in Ward 20 is clear that is light in colour and have a different flavour from other types of honey that is the eucalyptus flavour. Therefore, when the farmers are given capital they can produce more honey which will meet demand in Zimbabwe as well abroad. Tanganyika (2014) also stated that Zimbabwe is producing honey which is only catering for about 30% of the demand whilst the remaining 70% is not catered for. Allied Timbers Company they are having a project which they are implementing this year (2017) which will benefit the community as a whole in poverty eradication, employment creation and income generation resulting in food security. The manager outlined that they are giving 1000 top bar hives and langstroth hives which are modern hives to the community so as to increase production of honey in Mvuma. Allied timbers will also act as the buyer for honey which they are going to producing thus making market readily available for the farmers. The company will partner with big investors in processing and selling honey around Zimbabwe and the region as whole thus value addition.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The research outlined the contribution of apiculture to household income and food security. The research findings highlighted that the contribution of apiculture to household income and food security is significantly high. The main reason being that beekeeping is done as a hobby and the farmers are taking the advantage of the available forest (Mtao forest) and the available bees in the area. Harvested honey has direct and indirect impacts to income and food security. The harvested honey is sold to local markets and middlemen for income generation. The respondents indicated that the income is used to pay school fees and for household savings. The households also reflected that their diet was improved through beekeeping and on average, participating households are having at least two meals a day. Apiculture is also benefiting those who are not participating in bee farming through barter trade and pollination of crops in their fields.

The research also reflected on some of the loopholes that hinder the maximum contribution of apiculture to household income and food security. The major challenge being changes in climate causing disturbances to bees. Increase in temperature and rainfall has caused heat stress and flooding in the hives. Other challenges which were highlighted are theft, fire and financial constraints. Those who are not participating are blamed of stealing hives and honey in Rukweza village

The research also reflected some of the solutions to the above loopholes. The respondents outlined that the major solution to all the problems is building bee houses. Every farmer should have his/her own bee house so as to protect the bees from heavy rains, and heat stress is reduced. The bee house will also have a lock that will prevent thieves from stealing. During a veld fire also the bees will not be affected by the fire.

Above all, beekeeping has proved to be survival strategy in Ward 20 helping local people through employment creation, income generation, enhanced food security and healthy diet. The living standards of the people of ward 20, Chirumhanzu district have been improved and they are now better equipped with household resources that gives them access to physical and economic needs.

5.2 Recommendations

- The government of Zimbabwe should provide loans to bee farmers for them to build bee houses and have more hives so as to increase production and meet demand.
- The people of Rukweza must invest their income from apiculture into businesses that will continue to generate income ensuring that even if they are to face economic challenges and climate change in their hives they do not become vulnerable to food insecurity.
- Government at all levels should endeavor to stimulate farmers to boost honey production by providing and subsidize if need be, necessary infrastructures and enabling environment which provide impetus that will ease people transition from traditional to modern beekeeping easy.
- Allied timbers should engage more local people in apiculture projects so as to ensure public participation and improve living standards of people in Chirumhanzu ward 20.
- Local authorities (City Council) should construct a proper market place for honey and other bee products to reduce vendors along road sides.
- The people of ward 20 should form partnerships and open honey business which will be able to supply honey nationwide and abroad.
- The people of ward 20 should add value to bee products such as refining raw honey and use other products such wax to make candles as highlighted by ZIMASSET.

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Appendices

MIDLANDS STATE UNIVERSITY



FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

QUESTIONNAIRE: AN ASSESSMENT OF THE CONTRIBUTION OF APICULTURE TO HOUSEHOLD INCOME AND FOOD SECURITY. CASE STUDY OF WARD 20, CHIRUMHANZU DISTRICT, ZIMBABWE

FIELD WORKER..... DATE.....
QUESTIONNAIRE NO..... TIME.....
VILLAGE.....

This questionnaire has been designed to investigate the contribution of beekeeping to household income and food security in ward 20, Chirumhanzu district. The information obtained through this survey will be treated as highly confidential and will only be used for the purposes of this study. You are kindly requested to respond to the questions here in as truthfully as you can.

Please tick the box representing your response or fill in the spaces provided

NB * Do not write your name

Section A: Demographic /Personal details

- 1. Sex: Male Female
- 2. Age 15-24 25-34 35-44 45-54 55-64 65+
- 3. Marital Status: Single Married Divorced Widowed Single Parent
- 4. Educational Level: Primary Secondary Tertiary
- 5. Are you employed?: Yes No

If Yes please state occupation
.....

Section B: Major factors influencing participation of household in apiculture

6. What are the major factors influencing you to participate in apiculture. Tick all appropriate factors causing you to engage in apiculture.

Factors	Tick	Brief explanation
poverty		
Source of income		
Source of food		
medicine		
Climate change		
Poor soils		

Other factors

specify:.....

7. How long have you been engaged in apiculture? < 2yrs 2-4yrs >5yrs

8. Are you also involved in agriculture for income generation and food security? Yes No

If yes, indicate the activities.....

9. How many bee hives do you have?.....

Type of hive	Number
Traditional	
Top Bar Hive	
Langstroth	
Clay hive	
Box hive	
Other (specify)	

10. how did you arrive at this number of bee hives?.....

11. How many of your hives are occupied now ?.....

12. Did you undertake any bee management practices? Yes / No

Management practice	Undertaken	Not undertaken
Routine colony inspection		
Apiary management(clearing, shading) etc		
Division making		
Swarming control		
Feeding		
Pest control		

13. Do you have any beekeeping equipment? Yes No

If yes, which equipment did you have and use?

.....

If No, why did you not have the equipment?

.....

14. How much honey did you sell per annum? (Kgs)

15. Where did you sell the honey and at what price?

Market	Price per Kg(\$)	Remarks (raw or refined honey)
Local consumers		
Middlemen		

SECTION C; ways and extent in which beekeeping enhances household income and food security

16. Is beekeeping enhancing household income? Yes No

if yes, explain your response?.....

.....

17. Is beekeeping enhancing household food security? Yes No

If yes, Explain your response?.....

18. How many times do you harvest honey per season? Once twice more

19. What are the yields of hive production from each hive type per year?

Type of hive	Total harvested (Kgs)	Honey (kg)	Beeswax (kg)	Other products(specify)
Traditional				
Top Bar Hive				
Langstroth				
Clay hive				
Box hive				
Other (specify)				

SECTION D: challenges encountered in beekeeping activities which may compromise its sustainability as a livelihood strategy

20. Is there any challenges in beekeeping? Yes No

Challenge	tick	Comments
financial resource		
knowledge		
market		
climate change		
Pest/ diseases		

21. What are the solutions you have put it place to solve these challenges?

Thank you for your cooperation. Stay Blessed

Interview Guide for Forestry Commission Officer

Section A: Major factors influencing participation of household in apiculture

1. How long have you been in the district and when was apiculture introduced in ward 20?
2. What are the factors influencing people to undertake beekeeping?
3. How are you assisting bee farmers in protecting the environment where hives are located?

Section B: Ways and extent in which beekeeping enhances household income and food security

4. What are the ways in which beekeeping is enhancing food security?
5. What are other activities is FC doing to ensure food security?
6. How often do you visit the beekeeping project in ward 20?

Section C: Challenges uncounted in beekeeping activities which may compromise its sustainability as a livelihood strategy

7. What are the challenges you encounter in protecting the environment where the project is being done?
8. Are there any conflicts between FC and project participants?
9. If yes what are the conflicts?
10. How best can FC deal with these conflicts?
11. How often do you do environmental awareness campaigns in ward 20?

Interview guide for Allied Timber officer

Section A: Major factors influencing participation of household in apiculture

1. When did the project introduced in ward 20?
2. Why did you assisted in the implementation of this project?
3. What are the factors influencing participation of household in apiculture?
4. How is Allied Timbers assisting in the management of the project?

Section B: Ways and extent in which beekeeping enhances household income and food security

5. How is the project benefiting the community as a whole?
6. How is the project benefiting the participants?
7. Since you introduced the project, what are the benefits you have derived from it?

Section C: Challenges uncouncted in beekeeping activities which may compromise its sustainability as a livelihood strategy

8. What are the challenges bee farmers are facing in beekeeping?
9. What are the conflicts you encounter in managing the project?
10. Are they any problems between Allied Timbers and participants or which the bees?
11. How best can these challenges be address by Allied Timbers?

Thank you for your time!!!

Interview guide for Agritex officer

Section A: Major factors influencing participation of household in apiculture

1. When did the project launched in this district?
2. Why did the project launched in ward 20?
3. Are they any training contacted by Agritex to bee farmers?
4. If any, how often?
5. What are the factors influencing participation of households in apiculture?

Section B: Ways and extent in which beekeeping enhances household income and food security

6. To what extend is beekeeping contributing to household income and food security?
7. Is the project benefiting the district as a whole?
8. Besides beekeeping are the any other livelihood strategies you as the government introduced in ward 20?
9. If any how are they contributing to household food security?
10. How often do farmers harvest honey?
11. What is the quantity of honey harvested per annum?

Section C: Challenges encountered in beekeeping activities which may compromise its sustainability as a livelihood strategy

12. What are the challenges bee farmers are encountering in keeping bees?

Interview guide for the Councilor

Section A: Major factors influencing participation of household in apiculture

1. When did the project introduced in ward 20?
2. Why was it introduced in your ward?
3. What are the factors influencing participation of households in apiculture?
4. Is the community happy with the project?

Section B: Ways and extent in which beekeeping enhances household income and food security

5. How is the project assisting in alleviating poverty in ward 20?
6. Any seen benefits from the project which are helping the community to develop?
E.g. roads, schools etc.
7. To what extent is beekeeping enhancing household income and food security?

Section C: Challenges encountered in beekeeping activities which may compromise its sustainability as a livelihood strategy

8. What are the challenges you are facing as a community because of beekeeping project?
9. Are there any other livelihood projects in your ward 20?
10. What are the challenges the farmers are experiencing in beekeeping?
11. What are the possible solutions?

Thank you for your time!!!

OBSERVATION CHECK LIST

WHAT TO OBSERVE	WHAT WAS OBSERVED
How bees are managed By Agritex,FC, Allied timbers	
How honey is harvested	
Caring capacity of forest where bees are kept	
Types of hives used	
Type of crops being grown in ward 20	
State of the environment in terms of ecosystem security	
How honey is processed and packed.	

Human behavior/ attitudes towards the project	
Physical characteristics of the area(soil type, rivers, topography)	
Bees type under management	