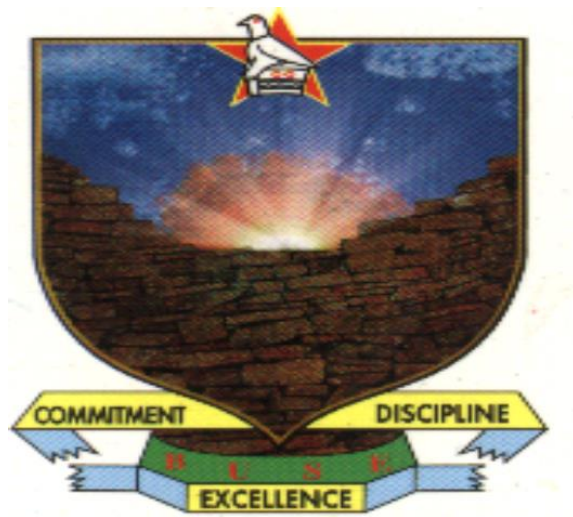


# **BINDURA UNIVERSITY OF SCIENCE EDUCATION**

## **DEPARTMENT OF NATURAL RESOURCES**

An Assessment Of The Socio Economic Factors Affecting Apiculture In Mashonaland  
Central.



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**B1852918**

**A PROJECT PROPOSAL SUBMITTED IN PARTIAL FUFILLMENT OF THE  
REQUIREMENTS OF THE BACHELOR OF NATURAL RESOURCES  
MANAGEMENT**

*2022*



## RELEASE FORM

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The undersigned certified that they have supervised and recommended to Bindura University of Science Education, Department of Environmental Science for acceptance of dissertation entitled '**An assessment of socio economic factors affecting apiculture in Mashonaland Central. A case study of Mupfure Community, Shamva District**' submitted in partial fulfillment of the Bachelor of Environmental Science Honours Degree in Natural Resources Management.

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## DECLARATION

I hereby declare that the research project entitled '**An assessment of socio economic factors affecting apiculture in Mashonaland Central. A case study of Mupfure Community, Shamva District**' submitted to Bindura University of Science Education, Department of Environmental Science is a record of an original work done by me under the guidance and supervision of Mrs.C. Masona. This work is submitted in partial fulfilment of the requirements for the award of the Bachelor of Environmental Science Honours Degree in Natural Resources Management. The results embodied in this dissertation have not been submitted to any University or Institute for the award of any degree or diploma.

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## **DEDICATION**

This project is dedicated to my sister Beverly, the rest of my family members and friends for their support throughout the period of this project.

## **ACKNOWLEDGEMENTS**

First and foremost, I would like to thank Mrs Masona for her excellent supervision of my assignment. I would like to thank my lecturers, Mr. Kudhlande and Dr. A. Mureva, Mr Dzingayi the chairman of the apiculture program in Mupfure Community, as well as the EMA Planning Officer for Mashonaland Central Province, Mr Mupotsa, and his staff, for their encouragement, support, and advice during the study time. I'd also like to convey my gratitude to my uncle and friends for their unwavering support. Without their support, I am confident that I would not have been able to complete this study. Above all, I am grateful to God for his inspiration and guidance throughout my degree program.

## **ABSTRACT**

The goal of the study was to look into the socioeconomic elements that influence beekeeping in the Mupfure community of Zimbabwe's Shamva District. Structured questionnaires, interviews, and focus group discussions were used to collect data. Ten villages were chosen at random from a total of eleven to represent locations where beekeeping is common. A total of 95 people were chosen at random and proportionately from the ten villages for the study. Data was analyzed using descriptive statistics, analysis of variance (ANOVA), and linear regression. The majority of the beekeepers (51.4 percent) were females, with the majority having between 2 and 45 colonies and 2 to 45 years of beekeeping experience in the research area. Bark hives and Kenyan Top Bars had a mean of 26.20 and 26.80, which was greater than the average number of other hives. Insufficient financing, theft, extreme weather, pests, and diseases were all mentioned as major obstacles to beekeeping in the study area. According to the regression model, the number of colonies held has a positive coefficient and is significant at 0.01 percent. To improve productivity, farmers should increase the number of colonies or hives they have.



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# **CHAPTER 1**

## **1.1 INTRODUCTION**

This chapter looks at the introduction and background of the study. It also includes the objectives of the study with the main aim being to assess the factors affecting apiculture production in Mashonaland Central. This section also includes the specific objectives and the research questions of the study. It also includes the study's relevance and boundaries. The section comes to close with a summary of the chapter.

## **1.2 BACKGROUND**

There is a very big dilemma in the world, where the population is growing at an exponential rate but without an increase in food production. A situation which is highly likely to cause food shortages and hunger. Agriculture is the backbone of the majority of countries in the world especially the developing countries. 70% of the population in the developing countries are one way or other involved in agriculture. Agriculture supports a lot of livelihoods offering employment, food and medicine. Agriculture is an integral part of the food system making sure that food is accessible and available which is one of the most critical activities in the acquirement of food security.

Apiculture is one of the unique branches of agriculture as it works hand in hand with other agricultural sectors. Apiculture has been practiced in Zimbabwe since the 18th century. (Chinaka, 1995). The rock paintings in the Matopo Hills suggest the evidence that beekeeping has been done for centuries. (Mazonde, 2014) Honey used to be gathered from caves, overhangs, hollows of trees and ground. Modern beekeeping methods were presented by various actors in the hope of improving the quality and yield of honey. There are about 85 794 beehives in Zimbabwe, with 80 percent of them being traditional hives. The Midlands province has the highest number of contemporary bee hives, whereas Matabeleland South has the fewest. Beekeeping is viewed as an initiative that can benefit both farmers' livelihoods and the environment, as bee foraging necessitates the preservation of trees and forests.

According to Agritex (2014), Zimbabwe has 15 967 beekeepers and has the capacity to produce 427 105 kilograms of honey. The current production, however, is 69 730 kg. In recent years, bees have been helpful in increasing crop yields by pollinating crops. In nearly all countries of the world, bees and their products have wider consumer preference, but provide sustainable livelihoods to many small scale farmers (Hilmi, Bradbear and Mejia 2011). Communities in Zimbabwe recognized the value of beekeeping mostly due to the benefits of the bee products. Other parties, such as the Forestry Commission and several

NGOs, supplement the Ministry's efforts by promoting beekeeping operations. Honey is one of the bee products that is widely used in food and traditional medicine. Honey is a natural source of energy and is high in micronutrients. Propolis is a natural antibiotic and antimycotic, according to additional research. Propolis can help boost the immune system (Farrerr et al 2004). Before communities realized the need to domesticate the bees through the use of traditional hives such as bark hives and clay pots, honey was harvested from the wild. Modern systems were introduced with the advancement of science and technology.

Papadopoulos was the first officer to expand beekeeping in 1962. At the time, few people kept bees, most likely due to a lack of advisors, and the Zimbabwean bee (*Apis Mellifera adansonii*) was regarded as aggressive (Papadopoulos, 1974). Kenya top bar and Langstroth hives were later introduced.

In 2010, global honey production totaled 1.54 million MTs, with China accounting for 26% of that total. Africa supplied 12%, with Ethiopia accounting for around 3% (45 300 Mts) (USDA, 2012). In Zimbabwe, smallholder farmers produce the majority of the honey, and the apiculture industry is still in its infancy. The Midlands, Mashonaland West, and Manicaland provinces produce the most of the honey.

Beekeeping has been a life-sustaining source of income and livelihood for many people. It is a low-input investment that does not compete in terms of resources with other businesses. Because of cross pollination, apiculture has proven to be important in crop production. It is also an aerial activity that does not compete for space with crop cultivation, but rather enhances crop productivity through crop pollination by bees (Chazovachii et al. 2012). It does, in fact, provide livelihoods for many farming communities with low-cost investment, simple equipment, and the ability to operate on marginal lands. It improves environmental and natural resource protection as communities realize greater benefits from forest management.

The beekeeping industry faces a number of challenges, including veld fires, a lack of modern hives, low productivity, and poor marketing systems, as well as a lack of financial support, poor processing methods, limited skills, pests, and diseases. In addition, the industry has inadequate sanitary and quality management services, as well as limited capacity and extension services support.

It is critical that interventions to reduce the increasing threats to apiculture be crafted to reduce the challenges of this sector. The interventions should include strengthening extension

systems, Queen bee breeding programs, research, improved marketing systems and development of the apiculture policy. Regulatory service support is also essential to assure the production of a safe product of high quality for ease of market access.

The paper looks at the socio economic factors affecting beekeeping systems, and production in Mashonaland Central. It also looks at the overview of the beekeeping sector in the country to identify gaps in market access, capacity building and productivity.

### **1.3 Aim**

To examine the elements that influence apiculture in Mashonaland Central region in order to develop this natural product business into a more productive and profitable business venture.

### **1.4 Objectives**

1. To determine the socio-economic characteristics of respondents that contribute to apiculture production
2. To analyses the factors affecting apiculture in Mashonaland central
3. To compare the honey yield across different hives

### **1.5 Research Questions**

1. What are the socio-economic characteristics of respondents that contribute to apiculture production?
2. What are the factors affecting apiculture in Mashonaland central?
3. Does the yield of honey vary among beehives?

### **1.6. Justification of study**

Most global discourses have advocated that individuals must show responsibility in conserving their surroundings for future generations while also profiting from them (Mutema 2014). This study builds on that by attempting to analyze the social and economic elements that are pulling back apiculture in Mashonaland Central. This will help to come up with better solutions to these problems such that beekeeping can be a viable business that will help the people in this region of Zimbabwe. By focusing on a small scale apiary in Shamva District of Mashonaland Central, this study acts as a wake-up call for the small scale and large scale beekeepers. The knowledge that will be gained in this regard can be used by researchers and policymakers in the future to develop more effective and sustainable bee keeping policies in similar situations around the world. Furthermore, the goal of this research is to encourage and promote innovation of existing ecologically friendly solutions that can be used to make apiculture more productive and be able to sustain rural livelihoods.

There are approximately 8 non-governmental organizations in Mupfure. It's vital to note that they serve the entire district (Government of Zimbabwe). The majority of these non-governmental organizations are primarily involved with HIV/AIDS and other health issues. Among these NGOs are World Vision, GOAL, and CARE International. It is critical to emphasize that there are relatively few groups in Mupfure that are involved with poverty reduction. SAFIRE, which focuses mostly on nutritional gardens, and GOAL, which provides bulls and boar goats, are two of these few. Plan International is the major organization in charge of the borehole drilling in Mupfure Community. Having stated this, it is clear that food security is a major concern due to a lack of direct support, highlighting the importance of understanding the contribution of beekeeping.

## **CHAPTER 2:**

### **2.1 LITERATUREREVIEW**

An apiarist or beekeeper raises bees in order to collect honey and other hive products such as beeswax, propolis, pollen, and royal jelly to fertilize crops or to breed bees for sale to other beekeepers. This type of activity is carried out in an apiary or bee yard. Apiarists typically strive to run profitable businesses based on honey bee population control. Apiculture, defined by Nwali (1989) as the breeding of honey bees in the hopes of obtaining financial benefits, is a neglected source of income. Other researchers, such as Ikediobi and Achobi (1985) and Morse (1989), define beekeeping as an art of growing, breeding, and maintaining bees in a similar fashion. Beekeeping is a source of income in underdeveloped nations, and Ethiopia is one of Africa's top honey producers, producing an estimated 44 000 tonnes each year. According to Lictaer (2007), apiculture can be used as a complementary source of income for farmers in communal societies and as one of the poverty alleviation projects. Furthermore, apiculture is a positive programme that not only improves the livelihoods of rural populations, but also protects the environment and the planet's vegetation in general (Mazorodze, 2014). It is environmentally beneficial, simple to implement, and the expertise may be passed down to future generations. It also takes less cash and resources, making it a more long-term source of income.

### **2.2 Factors Influencing Participation of rural Households in Apiculture.**

When Zimbabwe gained independence in 1980, it set out to alleviate poverty among the country's previously ignored black population. Despite government efforts, the number of households living on less than a dollar per day has been steadily increasing. With the current economic downturn, changing temperatures, seasons, and increased frequency of droughts, people have been forced to think outside the box in order to survive, and apiculture is one of these survival techniques.

When Zimbabwe implemented the Economic Structural Adjustment Programs (ESAP) in 1992 to compensate for the drought in 1991, the concept of beekeeping as a means of poverty reduction was implemented. According to Mazorodze (2014), in response to the drought, the Zimbabwean Women of Affairs, Gender, and Community Development established the Zimbabwe Farmers Development Trust (ZFDT) with the goal of identifying low-cost

programs to alleviate poverty. In this context, apiculture was identified as a project that requires few resources but has the potential to alleviate poverty.

According to Mazorodze (2014), the first initiative was implemented in Zimbabwe many years ago, with more than 20 districts participating, including Shamva. In Zimbabwe, beekeeping is a project that many people are unfamiliar with, but if established, it will give career opportunities and a breakthrough in household food security. Honey is used in many parts of Zimbabwe for a variety of purposes, including food, religious issues, and medicinal. In Zimbabwe, both men and women participate in apiculture, paving the way for poverty reduction and improved living conditions through greater household income. Through sustainable development and income generation from honey products, this sector has tremendous opportunities. In Zimbabwe, there is a higher demand for honey than present producers can supply, resulting in the importation of honey from other countries to meet demand, despite the fact that we have forest and natural resources to support our own apiculture business. This has also encouraged others to pursue apiculture because there is a ready market in Zimbabwe.

Because of the global economic downturn and decreased annual rainfall, which has impacted agriculture, the globe now requires survival strategies such as beekeeping, which is independent of the economy or rainfall patterns. Beekeeping, according to Ayansola (2012), will help to alleviate endemic poverty in Africa, particularly in rural areas. To put it another way, beekeeping, which is a type of agriculture known scientifically as apiculture, is a self-sufficient enterprise that can assist to alleviate economic troubles, unemployment, and other social vices (Ajao et al 2012). According to the FAO (2009), having access to a variety of options keeps people out of poverty. As a result, apiculture and related trades can provide valuable sustenance to a large number of individuals in rural areas. Beekeeping may be considered more than just a hobby for the majority of rural people and a part of rural life around the world (FAO 2009). According to Hilmi (2011), small-scale farmers' knowledge and capacity will be improved by introducing beekeeping as a business and developing pre-existing abilities. Beekeeping provides rural residents with job opportunities and growth by allowing them to become self-sufficient and less dependent on the government. They can also become economically empowered via the different benefits received from beekeeping (Oluwole 1999). Farmers that pursue apiculture in Zimbabwe, particularly in rural areas, have seen their livelihoods evolve, with a variety of benefits and outcomes. Apiculture is also practiced by villagers since bees serve as pollinators in their fields and forests. Beekeepers



and other individuals in rural communities use honey and bee wax to manufacture secondary products like candles, Mazorodze (2014). When bee products are manufactured, they produce higher returns than raw bee products. Bees are also environmentally friendly, cheap to produce, and information and skills can be readily transferred from generation to generation through IKS, which is why many villagers in Mupfure have chosen to participate in this initiative because not much external training is required.

### **2.3 Trends of Beekeeping in developing countries**

Few studies have looked into the role of apiculture in ensuring household food security in developing countries. The limited studies that were conducted focused mostly on the economic and social benefits of beekeeping. Many African countries are pursuing this beekeeping livelihood approach in order to sustain their economies. It has primarily been practiced in Tanzania, Ethiopia, and Nigeria, to mention a few countries.

Bradbear (2009), on the other hand, determined that beekeeping does not necessitate expensive equipment because basic hives can be created from locally available materials by local artisan beekeepers. Many homes in Nigeria have adopted this approach, utilizing local resources. In the Nigerian state of Kwara, Ajao and Oladimeji (2012) analyzed the impact of apicultural practices to household income and poverty alleviation. They stated that the average net return of honey produced per liter is between N1200 and N1500, while the average income per season per colony is between N7500 and N10,000. Despite the study's useful findings, it's surprising that the contribution of apiculture to household income was not investigated. Ajao et al. (2012) also stated that households can survive and improve their living standards with little income from beekeeping. Due to diverse ecological and climatic factors, Tanzania is said to have a big honeybee population and honey production potential (Goldenberg, 2004). In several parts of the country, a high diversity of bee forage has been observed (Chala, 2012). Tanzania is expected to have about 9.2 million bee colonies, with annual output potential of 138000 tonnes of honey and 9200 tonnes of bee wax worth \$345 and \$368 million, respectively (MNRT, 1998). Arumeru district is one of Tanzania's prospective beekeeping sites, with an annual honey yield of 1500 tonnes (URT, 1998). It's also worth noting that the region is one of Tanzania's most important coffee-growing regions, and there are various crops that attract and give honey flowers all year. However, the majority of beekeepers continue to use conventional production methods and are constrained by a lack of technical knowledge (Mustapha, 2000). As with many other scientific documents

that could be valuable in guiding sustainable beekeeping (Marcelian et al 2009), its utility has been underutilized.

According to Conarad (2007), beekeeping does not require a large piece of land, cultivated land, or a large amount of capital, and the benefits are realized despite the fact that it is smart agriculture. Bees come in a variety of kinds, some of which are solitary, such as "mason bees," and others that lay their eggs in burrows and colonies (bumble bees). According to Wildman (2009), these diverse bees are capable of interbreeding, resulting in hybrids that can fast spread over the planet. Hybrids resistant to parasites, disease, good honey production, behavior reduction, swarming, gentle deposition, and prolific breeding have been developed by bee breeding companies. In Asia, Africa, South America, and Australia, wild honey is still obtained by luring the bees with smoke.

According to Scoones (2018), agriculture today contributes roughly 20% of the national GDP of Zimbabwe. For the past decade, the country has experienced a major loss in agriculture due to an ineffective and unsustainable land reform program. According to Scoones (2010), in addition to land reform, Zimbabwe has been harmed by floods, ongoing droughts, climate change, and an unpredictable political situation, all of which have hampered investment and support from interested parties. With this background information about Zimbabwe, environmental Africa has to focus on other survival techniques besides agriculture, one of which is beekeeping. Many apiculture initiatives have been implemented and begun by the NGO in Zimbabwe's Mwenezi, Makoni, Nyanga, and Honde valley districts. Other regions, such as Shamva, eventually joined the project and are now reaping the benefits of beekeeping as a source of income.

## **2.4 The contribution of apiculture to Household Food Security in developing countries**

Zimbabwe has struggled to eradicate poverty since its independence in 1980. Despite the country's vast natural resources, many Zimbabweans live on less than a dollar a day. Following a devastating drought in 1991, the idea of apiculture was proposed as part of the Economic Structural Adjustment Program in 1992. (ESAP). Beekeeping was once thought to be a low-cost project that could help alleviate poverty.

According to Mazorodze (2014), the first apiculture project took place in Hurungwe, Mashonaland West province. Many projects have now been implemented in many areas throughout the country, including Shamva. . Despite the fact that many people in the country are unfamiliar with beekeeping, selling and marketing honey has improved the lives of many

people by providing job opportunities and cash, as well as increasing household food security. Honey is collected from hives in Shamva and sold in local markets for barter or money, generating revenue and ensuring the family's food security

Beekeeping has become one of the most profitable options resulting from the use of forests. This comes at a time when rural communities are increasingly aware of the importance of sustainable biodiversity management and environmental management methods. The extensive natural resources that Zimbabwe's rural areas are endowed with suggest that their management and usage might yield a variety of benefits (Chazovachii, et al 2012). Beekeeping is integrated into conventional agriculture, livestock, and agroforestry operations. In a similar manner, beekeeping contributes to food production by enhancing the pollination of food crops and so improving household food production. It also protects forests and promotes environmentally sound management practices by planting bee forage and deterring local communities from deforestation.

As a result of tree protection and honey harvesting, households may have access to fruits, medications, poles, and organic manure, and all of these benefits play an important role in poverty alleviation and environmentally sustainable development in developing countries. As Joni (2004) points out, beekeeping plays an important role in the socioeconomic development of rural livelihoods. Pollination is an important ecosystem service that contributes to biodiversity enhancement by preserving plant genetic diversity and maintaining ecological balance.

In addition, beekeeping has been proposed as a space-efficient and effective intervention technique for poverty reduction in countries with limited agricultural land. Rwanda, for example, exemplifies this point. Rwanda, known as the "Country of a Thousand Hills," has limited agricultural land, and land scarcity remains a source of concern in the country as poverty levels rise. As a result, the Access to Research for Development and Innovation (ARDI) initiative helped a number of traditional beekeepers adopt modern beekeeping techniques to increase honey output and household food security (Chala et al 2013)

Apiculture has long been a part of many people's livelihood plans in Zimbabwe, with a variety of consequences and benefits. Other benefits and consequences include material possessions, income, and the non-material benefits of happiness and well-being. Honey is also used as a family meal and as a treatment for a variety of ailments. Candles, a byproduct, are made from bee wax and honey by manufacturers and other businesses. Because secondary

goods generate more money than raw materials, this has primarily benefited household income and food security. Other bee products that can be harvested and sold to make secondary products, such as propolis, pollen, and royal jelly, can also help people's livelihoods.

Beekeeping, according to Best et al (1993), is a sustainable livelihood approach that ensures a visible feature within rural development. Beekeeping has proven to be an excellent complement to today's topic of sustainable development. This method has been successful in shifting rural development initiatives and economic difficulties to human rights and obligations to community resources.

According to Kubari (2014), livelihood is a collection of assets, capacities, and activities that humans require to survive. Sustainable livelihood is achieved when a livelihood recovers from and copes with shocks and pressures, while also improving its assets and skills now and in the future, all while not depleting local natural resources. Apiculture is a very effective means of generating and enhancing people's livelihoods because it generates and employs a variety of capital assets. Successful beekeeping is achieved when all of the livelihood assets are brought together. Those assets will improve household food security by looking at all elements of individuals.

## **2.5 The contribution of apiculture to household income in developing countries**

Apiculture is mostly practised in Zimbabwe's eastern forestry regions, including Honde Valley in Mutasa District. The farmers now have a well-established honey market, and the honey sold there is approved by the Zimbabwean Standard Association (SAZ). Local farmers use clay pots and wood hives, with each hive producing about 15kg of honey on average, and about 12kg once processed. When decanted into 500g bottles and sold at market price of \$4, each bottle generates a revenue of \$96 from just one beehive (Kubari, 2014). In a backdrop of low agricultural production that has exposed rural households to extreme poverty, beekeeping is a growing enterprise that can add incalculably to a household income. According to the Zimbabwean Independent (2014), Zimbabwe's rural poverty rate rose to 76 percent in 2014, up from 63 percent in 2013. Agricultural techniques, on the other hand, have failed to exorcise the ghost of rural poverty that has plagued the country for decades. As a result, beekeeping as a source of income has the potential to improve household food security and income.

Due to diverse ecological and climatic factors, Tanzania is said to have a big honeybee population and honey production potential (De Pauw, 1984). In several parts of the country, a high diversity of bee forage has been observed (Chala, 2012). Tanzania is expected to have about 9,2 million bee colonies, with annual output potential of 138000 tonnes of honey and 9200 tonnes of bee wax worth \$345 and \$368 million, respectively (MNRT, 1998). Arumeru district is one of Tanzania's prospective beekeeping sites, with an annual honey yield of 1500 tonnes (URT, 1998).

Ethiopia is the top producer and exporter of honey in Africa, according to Azeez et al (2014), producing an estimated 44,000 tonnes worth \$76.6 million. Beekeeping can be used as an additional source of income for farmers in rural regions, according to Lietaer (2007), and has been successfully applied in poverty-relieving projects. Similarly, beekeeping is a constructive initiative that not only helps to improve the livelihoods of rural communities, but also helps to protect trees, which helps to safeguard our planet. In truth, beekeeping is environmentally friendly, requires few resources to begin production, can be rapidly resumed after a crisis, and the necessary skills are easily passed down from generation to generation, making it a viable option.

Honey production is considered to be one of the most profitable businesses in many parts of the world. In the United States of America, for example, more than 100 million kg of honey are produced each year. Beekeeping programs are primarily prevalent in African countries such as Tanzania, Kenya, Uganda, Zambia, Malawi, and South Africa. At least half of the honey produced in these nations is used domestically, with certain countries having surpluses for export. Honey exports have boosted a country's economy by generating foreign currency. In Nigeria, Ayansola (2012) noted that beekeeping aids in the eradication of poverty, particularly in rural areas.

## **2.6 Challenges in apiculture in sector**

Despite the ideal natural environment in Zimbabwe, beekeeping frequently lacks the essential national capacity in the form of financial and technical support to fully utilize its great potential in forest and natural ecosystem conservation and poverty reduction. Tanzania is in the same boat. Tanzania has around 2 million traditional artisanal beekeepers, according to Tanganyika (2014), but they lack modern equipment, training, funding, and a market. As a result, Tanzanian beekeeping has yet to realize its potential for poverty alleviation.

At Arumeru in Tanzania, Chala et al (2013) discovered that a lack of sufficient beekeeping knowledge and financial constraints are the most important hurdles to apiculture. For the past decade, village leaders in Arumeru have not been visited by expert beekeepers or requested to attend any apiculture training. Tanzania has put in place a sufficiently progressive strategy and organized framework to manage the development of apiculture and forestry on a broad scale (Milledge et al 2007). However, in practice, there is a lack of application of these policies, particularly in the country's beekeeping facilities, which has contributed to the sector's poor performance.

Droughts in Tanzania have grown from once every ten years to once every two years, according to Goldenberg (2004), and they are predicted to become more frequent and severe as a result of climate change. Periodic famines are caused by a lack of adequate food and water for bees, resulting in colony absconding and relocation. This translates to significant losses for beekeepers, who may be without honey for a few seasons.

Insecurity/theft and vandalism, according to Gujarati et al (2014), is another constraint to beekeeping. Theft of hives and honey has become a big problem in the country, despite being unique and forbidden in many civilizations. Vandals and hooligans have been known to employ deadly chemicals to immobilize bees before stealing their honey and, in some cases, taking the hives. This troubling issue is frequently related to rising levels of poverty brought on by unemployment, especially among the youth. Building bee houses to safeguard the hives or investing in extra security measures may prove to be costly methods of vandalism prevention.

## **2.7 Knowledge gap**

Because the benefits of bees and beekeeping are not generally known by stakeholders, the potential of beekeeping in underdeveloped countries is far too often underutilized in development initiatives. The majority of literature contains a wealth of beekeeping information. However, much of the literature only mentions beekeeping's importance to a country's economy in industrialized countries. Scholars have acquired very little information on the importance of apiculture to household income and food security, as well as the issues that are impeding its growth. The goal of this study is to give farmers and development stakeholder's relevant evidence on how beekeeping may be used as an alternative livelihood strategy and to highlight the factors that influence this sector. This research aims to delve

deeper and fill in the gaps left by previous scientists who have concentrated on other aspects of beekeeping. It will also equip forestry stakeholders with the required information and motivation to view apiculture as a national and protective activity that should be considered and integrated into national forest initiatives as well as other development programmes such as poverty reduction measures. In a broader sense, the research aids in the creation of policies that would help to improve not only rural income but also overall poverty in the economy. These rules would also help Zimbabwe lower its honey import expense, as 60 percent of the honey consumed in the country is imported. Zimbabwe may possibly enhance honey production and begin exporting to other countries based on the findings of such studies.

## CHAPTER 3: MATERIALS AND METHODS

### 3.1 DESCRIPTION OF THE STUDY SITE

The research was conducted at Mupfure communal land, which is located 60 kilometres from Bindura along the Bindura-Mount Darwin road in Mashonaland Central Province (Figure 3.1). Shamva District includes the Mupfure village. The average annual rainfall in this area is between 750 and 950 millimetres. There are some intermittent dry spells and moderate mid-rainy seasons. Mupfure includes 11 settlements and around 1 207 houses, with a total population of 5 836 people, including 3 072 women and 2 767 men. Figure 3.1: Map of Mupfure Community, Shamva District, Ward 2.

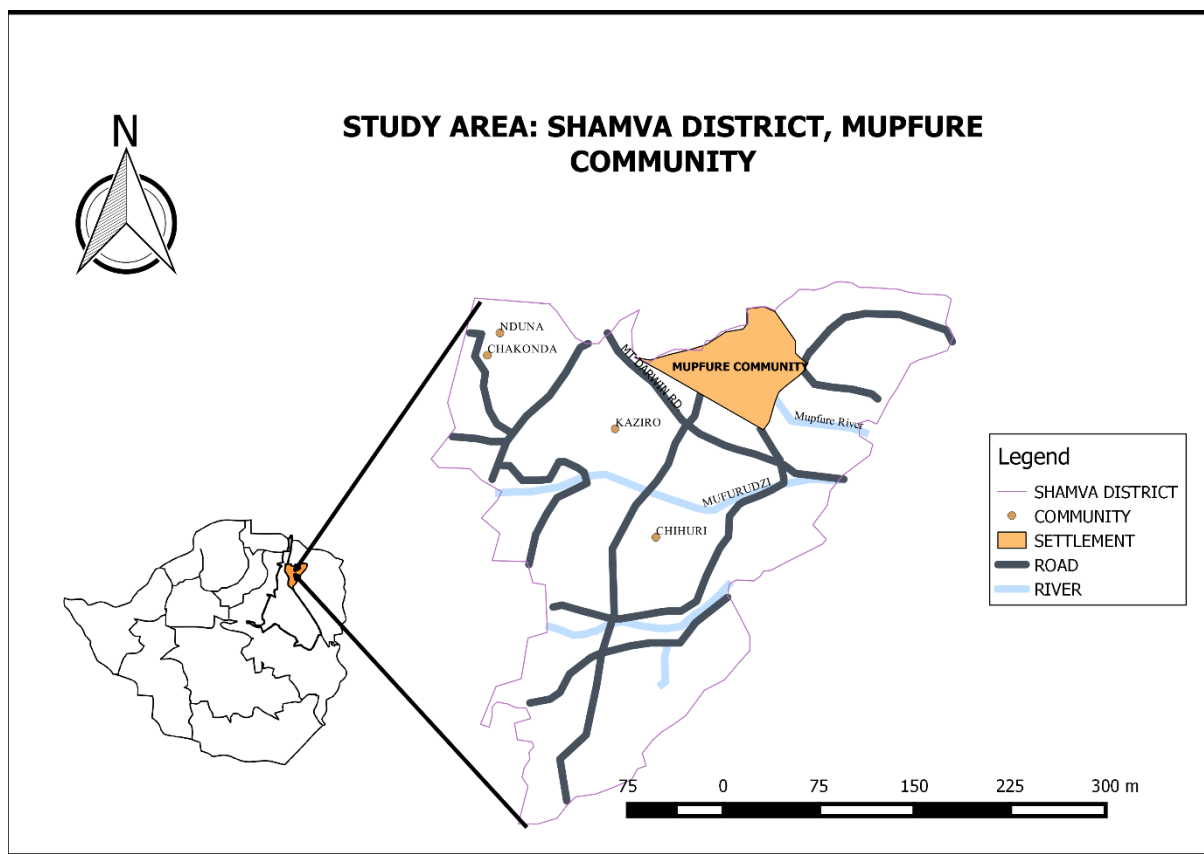


Fig 3.1 Map of Mupfure Community

### 3.2 RESEARCH DESIGN

#### 3.2.1 SELECTION OF THE STUDY SITE

The socio-economic implications of beekeeping in Shamva, Mashonaland Central region, Zimbabwe, were investigated using a case study technique. The Mupfure community was



chosen because of its beekeeping advantages. This community is a communal area that is relatively large in comparison to the surrounding communities in the district. Mupfure is a mountainous and well-forested location with a diverse range of tree types that supply nourishment for bees and allow hives to be established. Mupfure also has the advantage of being close to water sources. Out of the eleven villages in the ward, ten villages were purposefully chosen. These are the places where farmers mostly practice beekeeping. Purposive sampling was used to find respondents with extensive knowledge of beekeeping practices, particularly among important informants. This strategy was utilized to obtain the precise data required for the investigation.

### **3.2.2 SELECTION OF RESPONDENTS**

Since some community members were difficult to reach, convenient and random sampling approaches were used, and some respondents were chosen from the accessible population. This was done in order to acquire accurate, reliable, diverse, and current information on the social and economic implications of beekeeping programs in Mupfure. From the 500 farmers who practice beekeeping and some non-beekeepers in the ten villages, 95 respondents were chosen. 70 were beekeepers, 20 were non-beekeepers, and 5 were key informants from various community-based groups.

### **3.3 DATA COLLECTION PROCEDURE**

While doing the research, community leaders were consulted so that they were aware of the study in their region, could lend their support, and the community could freely participate. The information was gathered between March 18th and April 21st, 2022. The distribution of questionnaires was done door to door with the help of two of the researchers' friends who served as enumerators. The interviews were done in many locations, including the local market, the shopping center, and the local clinic. On an organic honey workshop at Mupfure Secondary School, focus group talks with key informants who were traditional leaders and extension officers were held.

### **3.4 DATA COLLECTION METHODS**

The data for the study were obtained from both primary and secondary sources. The primary data were collected with the aid of a structured questionnaire and personal interviews conducted with respondents who could not read and write. The results of the interview were then entered into the questionnaire. Secondary sources of data included, journals, past 10 projects and the internet. Data were collected on socio-economic variables such as gender,

activities done besides beekeeping, age, marital status, barter trading, price of honey, yield obtained per hive, beekeeping training and income level. Data were also collected on the benefits of beekeeping and problems associated with beekeeping in the study area.

### **3.4.1 QUESTIONNAIRES**

Questionnaires were given out to both beekeepers and non-beekeepers in the shopping center, which was a handy location for the study. A total of 90 surveys were delivered to beekeepers and non-beekeepers. The researcher utilized a door-to-door technique, which allowed him to interact with the respondents. Apart from the benefits, the researcher wanted to use the questionnaire, but it had some disadvantages. To begin with, the validity and accuracy of question from respondents was concerning. To please the researcher, the responders may not express their actual feelings and supply incorrect information.

Second, the research tool implies that all respondents are literate, which may not be the case, and that the researcher has no control over who fills it out. The questionnaire was designed using the study questions as a guide. To provide more diverse data gathering, the questionnaire design included both closed-ended and open-ended items. The closed-ended questions were utilized in an effort to save time and money, as well as to make analysis easier because they were ready to use right away. Whereas the open-ended questions were used with the aim of encouraging the respondent to give an in-depth and felt response without feeling held back in revealing of any information. As to observe the right of anonymity of the respondents, the questionnaire design was coded with numeric identity. Ninety-five questionnaires were administered to research participants and were directly collected after they were completed.

### **3.4.2 INTERVIEWS**

The respondents were easily available so, data was collected face to face. At the neighborhood shopping center, interviews were done at random as the researcher approached anyone in her path. The community members would visit the retail center, therefore this was a convenient location. The majority of those interviewed were not beekeepers. Market vendors and some store employees were also questioned. Interviews had advantages that compensated for the questionnaire's shortcomings, such as the ability to probe deeper into responses that were ambiguous and required additional clarification (Cooper and Schindler, 2011). Respondents provided immediate comments during interviews. The instrument's

disadvantage was that it was difficult for the interviewer to schedule interviews and give enough time.

### **3.4.3 FOCUS GROUP DISCUSSIONS**

Community leaders and groups that work with the community were the focus of focus group talks. Traditional leaders, Environment Africa, the Environmental Management Agency, and Forestry Commission extension officers were among the primary informants. Following a community organic honey workshop, the discussions took place at Mufure Secondary School. This strategy was utilized to gather appropriate, trustworthy, and authentic information on community beekeeping projects. These were the main informants with the most up-to-date information on issues that may be influencing beekeeping programs in the neighborhood and the district as a whole that aren't completely understood. The researcher used a discussion guide that included certain questions for the informants to answer.

### **3.5 Data Analysis and Presentation**

According to Myers *et al* (2010), descriptive statistics summarizes important characteristics of a sample of data and form the basis for making inferences about the population from which the sample was obtained. Descriptive statistics were used to analyze the level of adoption of beekeeping in the community. The Environment Africa report (2001) revealed that a total number of 600 farmers were trained on beekeeping. A one way Analysis of Variance (ANOVA) at 5% significance level was used to ascertain if there were any significant differences in average honey yield across different types of hives using the SPSS for windows version 21 software(2013). In addition, a Post-hoc test, Tukey was also used to compare the means of the two variables to testing hypotheses of two conditions or levels. A linear regression model was used to determine the factors affecting beekeeping in Mupfure community. Income generated from honey was used as the independent variable and the dependent variables were years in beekeeping number of colonies, type of hives, harvesting times, yield obtained/hive, customers, price of honey/kg, theft on honey and hives pests and diseases, markets, age, gender and marital status.

## CHAPTER 4: RESULTS AND DISCUSSION

### 4.1. HOUSEHOLD DEMOGRAPHIC INFORMATION

According to the findings of the study, the respondents ranged in age from 25 to 70 years. Beekeepers, like non-beekeepers, range in age from 25 to 70 years. Beekeepers' age distribution is generally within the active working age range. However, the proportion of young people under the age of 25 who are involved in beekeeping is small. Females made up 51.7 percent of the respondents interviewed, while males made up 48.3 percent. In terms of marital status, 82.5 percent of respondents were married, and 75.4 percent of this group was involved in beekeeping, compared to 17.5 percent who were single. Only 5% of non-beekeepers farm because the majority are involved in other economic activities such as mining.

Table 4.1. household information obtained from beekeepers and non-beekeepers

Variable	categories	beekeepers		Non beekeepers
Aggregate				
Age	maximum	70yrs	65yrs	70yrs
	minimum	25yrs	25yrs	25yrs
Gender	Male	48.6%	45%	47.1%
	Female	51.4%	55%	52.9%
Marital Status	Married	82.5%	80%	81.5%
	Single	17.5%	20%	18.6%
Economic	farming	83.1%	5%	64.7%
Activities	mining	4.6%	45%	12.9%
	Brick molding		10%	24%

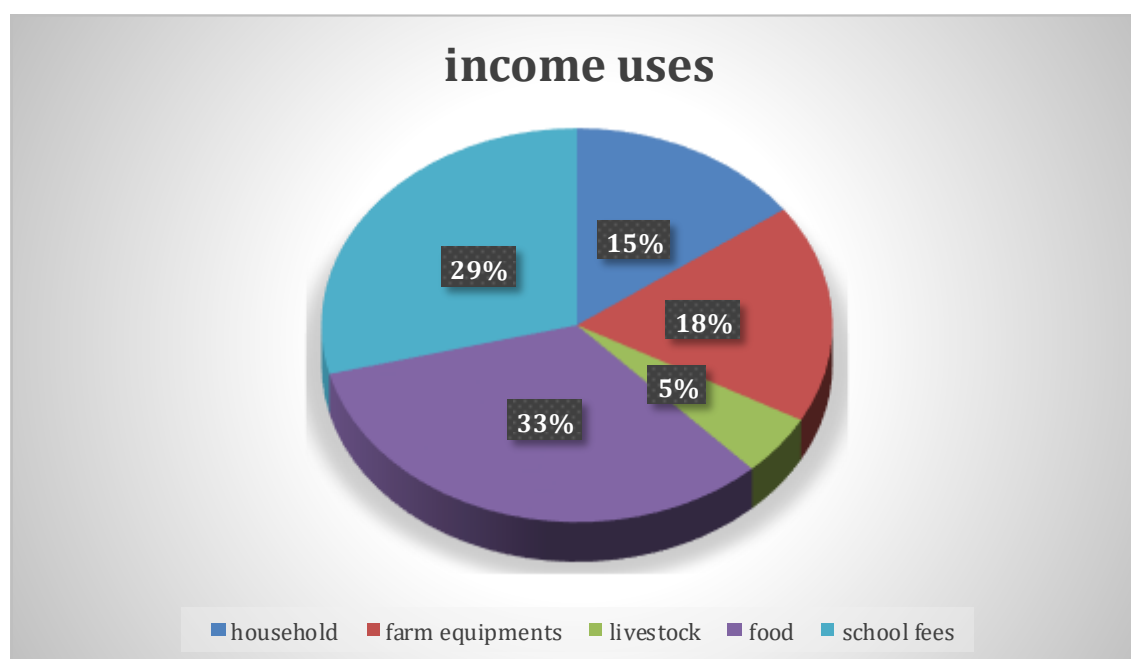
### 4.2 HOUSEHOLD INCOME AND USE

Table 4.2 shows that beekeepers earn significantly less than non-beekeepers, with an average of \$112.50 compared to \$366.50 for non-beekeepers. A large portion of the income is spent on sending children to school and purchasing food for both beekeepers and non-beekeepers.

Table 4.2

Table 4.2 Income earned by beekeepers and non-beekeepers from their different activities

Variable	Category		Beekeeper	Non-beekeeper
<u>Aggregate</u>				
Income earned	maximum	\$500	\$750	\$750
	minimum	\$150	\$200	\$200



Average income	\$112.50	\$366.45	\$326.84
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Figure 4.2 Uses of income obtained by both beekeepers and non-beekeepers.

### 4.3 ECONOMIC CHARACTERISTICS OF BEEKEEPERS

The current study revealed that the mean price of honey per kilogram. (\$2.85) is too low because mostly a 300gram bottle of honey costs between \$3 and \$4. Hence the low prices of honey have negatively impacted on the household income of beekeepers. Because of the great need for money and also the need to get rid of honey, beekeepers have been forced to sell their honey for as little as a dollar per kilogram. This has led to low income such that some of them have resorted to other economic activities which can help supplement their income.

Table 4.3 Years of experience of beekeeper, their number of colonies, times of harvest and the price at which honey is being sold per kilogram.

Variable	Minimum	Maximum	Mean
Years of experience	2	45	9.68
No of Hives	2	45	11.32
Time of harvest	1	3	2.22
Price/kg	\$1	\$9	\$2.85

#### **4.3.1. SOURCES OF HIVES, PLACE OF SELLING HONEY AND THE TYPE OF CUSTOMERS WHO BUY HONEY FROM THE BEEKEEPERS.**

The majority of beekeepers (58.6 percent) sell their honey directly to local consumers within the Mupfure community and Mt Darwin growth point. Beekeepers' household income has been impacted by the sale of honey at local markets. The underlying reason is that the majority of the customers are fellow community members who occasionally bargain for a lower price to suit their budget. The Mupfure community accounts for 82% of the buyers. Because most people are involved in beekeeping projects, barter trading of honey for other foods has an impact on income and competition in the community. As a result, beekeepers face difficulties in selling honey. Beekeeping marketing channels are inadequate.

Table 4.4 Sources of hives, place of selling honey and the type of customers who buy honey from the beekeepers.

Variable	Category	Frequency
Percentage		

Source of Hive	Local Market	22	31%
	Organization	34	48.57%
	Forest	14	20%
Place of Sale	Local, Market	41	58.6%
	Bindura	7	10%
	Harare	5	7%
	Mt Darwin	17	24.3%
Buyers	Individuals	51	72.86%
	Companies	19	27.14%

#### 4.4 COMPARING MEANS OF HONEY YIELD OBTAINED PER HIVE

Displays the different means obtained from various types of hives as well as the average yield derived from a specific hive. According to the outcomes, the bark hive and the Kenyan Top Bars (KTB) have higher means, 26.20 and 26.80, respectively, than the other hives, implying that they generate more and better output in beekeeping projects. As a result of their low yield, the use of other hives results in low beekeeping productivity. Means with the same superscript are not significantly different.

Table 4.5 A comparison of means of honey yield obtained per hive.

Type of Hive	Mean	Std Deviation
KTB	26.80 <sup>a</sup>	5.259
Tree bark	26.20 <sup>a</sup>	6.437
Tin	12.20 <sup>b</sup>	1.789
Clay pot	13.60 <sup>b</sup>	3.507
Greek Basket	10.20 <sup>ab</sup>	7.895
Langstroth	13.40 <sup>b</sup>	4.219

#### 4.5 LINEAR REGRESSION MODEL SUMMARY

R. Square was 81.2 percent according to the regression model summary. This demonstrates that the linear regression model was successful in fitting the set of observations or data.

## **CHAPTER 5: DISCUSSION**

Many residents in Mupfure admired how apiculture improved their living standards and was considered as a lifesaver in the fight against poverty by supplying food and money while completing other tasks. According to Nwali (1996) a research conducted in Pakistan, Nwali (1996) beekeeping enhanced keepers' income and improved their living conditions. Beekeeping has been strengthened by backward and forward linkages, which means that beekeeping and community activities impact each other by increasing human, social, natural, physical, and financial capitals.

83% of the 600 people who were trained took up beekeeping. Because beekeeping is part of agricultural operations that improve crop output through pollination, the majority of these beekeepers are farmers. Due to the ideal climate and soils, farming was the primary economic activity in the communal area. Because of the abundance of fodder and water, farmers found it simple to undertake beekeeping. Due to a variety of factors revealed by the group, only 17% of the villagers failed to venture into beekeeping. The majority of these non-beekeepers expressed concern about not having enough time to do beekeeping due to other commitments such as tobacco curing. They are active in occupations such as brick molding, teaching, construction, tobacco cultivation, and nursing, all of which take a lot of time and are physically demanding. A few non-beekeepers were not taught in beekeeping and are unable to practice it due to their inexperience. The failure of some villagers to become beekeepers was due to a lack of capital. Despite receiving instruction, several people were unable to obtain the necessary equipment, which included hives, bees wax, and other goods.

The majority of the beekeepers were in their active and productive age group, according to the findings. Because beekeeping is time consuming and requires constant monitoring and management, the age distribution of beekeepers is often within the active working age range. Beekeeping was only performed by one farmer above the age of 60. According to Tijani et al.



(2010), the type of agricultural activity a farmer can engage in is influenced by his or her age. Younger people, for example, spend more time and are more likely than older people to engage in labor-intensive farming activities.

Women outnumber men in the Mupfure community. Women are typically attributed with or involved in activities that occur within the confines of their homesteads, whereas men typically work in industries in towns and cities. In Nigeria, on the other hand, men outnumber women in honey production. In the study, 100 farmers were chosen at random from the Chibok Local Government Area of Borno State, Nigeria, with 90% of the survey participants being males and 10% being females (Tijani et. al., 2010). It was suggested that the reason could be due to male farmers' has huge responsibility in the household as family heads, having many people to feed. As a result, they devote more time to beekeeping in order to provide for their families' food and other basic needs. Females were less involved in beekeeping, probably due to the male-dominated land ownership configuration.

According to the study, married people in the Mupfure community are more active in beekeeping more than single people. According to the data collected from the respondents, married people have the advantage of sharing responsibilities, whereas single people have no one to share with. Married people can share tasks and help each other out, whereas single parents have all of the responsibilities on their shoulders, making the burden heavy. As a result, they focus on one activity that they can handle.

When compared to the income generated by other community activities, beekeeping has proven to be a very low earner. A beekeeper's average income in Mupfure is \$112.50, compared to \$366.50 for non-beekeepers. A number of factors, including the price at which honey is sold per kilogram, influence beekeeping income. Honey costs an average of \$2.85 per kilogram, or over \$3.00. Honey is currently being sold for \$3 to \$5 per 300g bottle, which is far too low. The low prices of honey are due to the enormous number of persons selling honey in the same place. As a result, producers are obliged to sell their honey at extremely low prices in order to compete and provide for their families. Another cause for beekeepers' low income is the lack of a proper and trustworthy market for their honey. Beekeepers were selling 80% of their honey to members of the community, resulting in low pricing since prices alter when someone begs for a lower price, unlike in a proper market place where prices are fixed.

The community's goal was to improve their social and economic well-being, so they took up beekeeping. Rural areas are more prone to poverty, and as a result, they are unable to provide enough food for their family, as well as formal education for their children. The Mupfure people spend the majority of their income on feeding their families and sending their children to school. Despite the little income from apiculture, 33 percent is spent on food and 29 percent on children's education.

There were several issues with beekeeping that the beekeepers revealed. Every year, a considerable number of beehive colonies are reported to be stolen in the researched neighborhood. Every year, criminals steal beekeepers' hives and honey, according to the beekeepers. This has had an impact on their earnings and yields. Beekeepers have also expressed concerns about extreme temperatures, honeybee diseases, pests and chemicals, as well as a lack of training and funding. Similarly, beekeepers in Saudi Arabia reported that 24.65% of their colonies were lost in 2012, with the main causes being a lack of honeybee food, illnesses, pesticides, honeybee enemies, and severe temperatures (Al-Ghamdi, 2010).

The study discovered that the bark hive yields more honey than the Greek basket, tin, clay pot, langstroth, and the popular Kenyan Top Bar hive among the several types of hives utilized in the Mupfure community. The best types of hives were the bark and Kenyan Top Bar hives. As a result, the majority of beekeepers employ them. Wilson (2006), on the other hand, claims that conventional hives, including the bark hive, produce minimal production. Mwakatobe (2008) claimed, based on a study conducted in Tanzania in 2007, that despite the high yield they produce, bark hives should not be promoted since they harm the ecosystem.

To increase yield, the number of colonies must be increased. According to Tijani et al. (2010), the greater the number of beehives or colonies a farmer has, the greater the income acquired by beekeepers. This is acceptable because beekeepers with a large number of colonies earn more money than those with fewer colonies. Beekeepers in Bangladesh increased the number of hives and earned more money than before (Moniruzzaman and Rahman 2009). In contrast to the Ethiopian study, Gebremedhn and Estifanos (2013) concluded that hive location and type have a significant effect on honey yield per hive.

## **CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS**

### **6.1 CONCLUSION**

The majority of those interviewed are farmers involved in beekeeping in the study area. 52.3 percent were females, and beekeeping paid less compared to nonbeekeepers. Beekeeping has proven to be a profitable economic activity in the study area, allowing farmers to earn good returns if they can find a proper market with reasonable honey prices. Among the 600 villagers who had been trained, 83 percent had taken up beekeeping. The bark hive and the Kenyan Top Bar hives have proven to be the best hives in beekeeping, producing higher yields than other hives. The data further highlighted that modest numbers of colonies are the key factor impacting farmers' household income in beekeeping. However, inadequate capital and theft were the key challenges militating towards apiculture in the research area.

### **6.2 RECOMMENDATIONS**

According to the study's findings, farmers should increase the number of colonies or hives they have in order to achieve a higher output, which will significantly raise their revenue from beekeeping. Farmers engaged in honey production could perhaps establish cooperative groups to access credit facilities from government and financial sectors. This credit will allow them to expand their colonies and earn more money. The government should continue to fund farmers' access to effective apicultural technologies. Because part of the money might well be redirected to other purposes, non-governmental organizations can offer farmers with beehives rather than cash. There is also a need to organize a group of scouts to monitor and check beehive theft in the area so that farmers' efforts are not in vain as they expand their colonies. Beekeepers can also be taught how to build hives and produce queens in order to boost bee populations.

The availability of a wide range of plants over time contributes to big populations of bees, allowing beekeepers to split colonies and increase their number of hives. Because part of the money might well be redirected to other purposes, non-governmental organizations can offer

farmers with beehives rather than cash. There is also a need to organize a group of scouts to monitor and check beehive theft in the area so that farmers' efforts are not in vain as they expand their colonies. Beekeepers can also be taught how to build hives and produce queens in order to boost bee populations. The availability of a wide range of plants over time contributes to big populations of bees, allowing beekeepers to split colonies and increase their number of hives.

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## **Appendix 1: Questionnaire for beekeepers**

### **BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**An assessment on impacts of beekeeping on social and economic aspects on Mupfure community.**

My name is Rangarirai Honour Makoto 45-2000087R45. I am a student at Bindura University of Science Education. This questionnaire has been designed in partial fulfillment of **Bachelor of Environmental Science Degree in Natural Resources Management**. I am requesting for your participation in this survey by answering the scheduled questions. The purpose of this survey is to obtain information on current honey bee husbandry practices in Mupfure Community. The assessment will help to provide baseline data on how beekeeping projects have benefited the community in their economic and social lives. All your answers are strictly confidential and will only be used for academic purposes.

**Questionnaire number.....**

**Date.....**

**Village Name.....**

**Instructions:** Please fill in the blank spaces provided for open ended questions.

#### **SECTION A: DEMOGRAPHIC DATA**

Q.1 Please give your age.

- |                      |                   |
|----------------------|-------------------|
| a) Less than 15years | b) 15-30years     |
| c) 31-40 years       | d) 41-50years     |
| e) 51-60 years       | f) above 60 years |

Q. 2. State your gender. Male                      Female

Q. 3. What is your marital status?

- |            |           |
|------------|-----------|
| a) Married | b) Single |
|------------|-----------|

#### **SECTION B: BEEKEEPING BACKGROUND**

Q. 4 When did apiculture started in Mupfure community? Year.....

Q. 5 Are doing Apiculture project?

Yes .....

No .....

Q. 6. When did you start beekeeping projects? Year.....

Q. 7. How many beehives do you have?

Answer.....

Q. 8. *Please fill the table below with suitable answers.*

<b>Ty of hives owned</b>	<b>Number of hives owned</b>	<b>Frequency of harvest per year</b>	<b>Yield obtained per hive</b>
Clay pots hives			
Bark/long hives			
Tins hives			
Greek basket hives			
Kenyan Top Bar hives			
Langstroth hives			
Others ( specify)			

Q. 9. Where do you find your hives?

Response .....

### **SECTION C: SOCIO-ECONOMIC IMPACTS OF BEEKEEPING**

Q. 10. Do you eat some of your honey?

Yes.....

No.....

Q. 11. Do you practice barter trade of honey and other products with other people in your area?

Yes.....

No.....

Q. 12. Are you able to feed your family the rest of the year with the income from apiculture?

Yes..... No.....

Q. 13. Do you sell your honey?

Yes..... No.....

Q. 14. If yes where do you sell your honey?

Response .....

Q. 15. Who are the buyers of your honey?

a) Individuals                      b) Businesses

c) Institutes                      d) other

(specify) .....

Q. 16. How much do you sell your honey per kg? Response.....

Q. 17. Are there any other economic activities that you do except apiculture?

*State if appropriate, for example, mining, welding, farming, building etc*

Response .....

Q. 18. How much do you get from that activity, in monetary terms?

a) <\$60                      b) \$60 - \$150                      c) \$150 – 50

d) \$250 - \$600                      e) >\$600

Q. 19. What were you do for a living before you engaged on apiculture?

Response .....

Q. 20. How much were your earnings from those activities?

a) <\$60                      b) \$60 - \$150                      c) \$150 – 350

d) \$350 - \$600                      e) >\$600

Q. 21. What is the main use of your income from apiculture?

***Please fill in the table below with relevant responses***

Uses of income from beekeeping	Tick your answer
School fees	
Buying live stock	
Buying farm equipment	

<b>Buying food</b>	
<b>Buying household property</b>	

## SECTION D: OPINIONS AND RECOMMENDATIONS

Q. 23. Did you get any training on apiculture? Yes ..... No.....

Q. 24. Who trained you? Specify the name

a) Institution(s).....

b) Individual(s).....

c) self

Q. 25. Is the training beneficial to you? Yes..... No.....

*Explain further*

Response.....  
.....  
.....

Q. 26. Are you facing any challenges? Yes..... No.....

Q. 27. If yes specify the challenges?

*Briefly explain*

Response.....  
.....

Q. 28. Does apiculture project disturb other household activities?

*If yes explain how.*

Response  
.....  
.....

Q. 29. What should be done to promote apiculture in your community?

*Briefly explain your response*

.....  
.....

## **Appendix 2: Interview guide for beekeepers.**

1. When did apiculture projects start in Mupfure?
2. Which year did you start this project?
3. What were you doing for a living before you start this project?
4. Besides apiculture what other economic initiatives do you do?
5. Are those initiatives more financially productive than beekeeping?
6. Did you get any education on apiculture and who trained you?
7. Has the education been of any beneficial to you?
8. What is the total number of your beehives?
9. Which type of hives do you have and where did they came from?
10. What is the frequency of your harvesting and how much honey do you harvest annually?
11. How do you market your honey?
12. Does apiculture give you enough capital to feed your family for the whole year?
14. Do encounter any problem from apiculture?
15. What type of problem are you facing?
16. What should be done to improve beekeeping projects in your area?

### **Appendix 3: Interview guide for non- beekeepers.**

1. Do you benefit from the apicultural being done in this area?
2. If yes, in what way?
3. Are you assisting beekeepers in doing their work?
4. If yes, in what way are you assisting?
5. Are these developments helping you to have adequate nutrition in your family?
6. Are you having challenges in your family due to apiculture?
7. What are the challenges?
8. In what way do you think these problems can be solved?
9. How can we promote apiculture in this area?

## **Appendix 4: Focus group discussion guide for traditional leaders**

1. What efforts have you made towards helping the beekeepers in your community?
2. How is beekeeping contributing to food supply in your community?
3. How are villages adjusting to apiculture to improve their livelihoods?
4. What are the effects of apiculture on people's livelihoods?
5. How can we promote apiculture in this community?

## **Appendix 5: Focus group discussion guide for EMA and Environment Africa**

1. Did the community get any form of education on apiculture?
2. To what extent did people accept apiculture in this area?
3. In what way did apiculture modified the livelihoods of people?
4. To what extent is apiculture promoting food security in the neighborhood and how?
5. What are the problems that are being faced in apiculture and how are you coping with them?





## MAKOTO PROJECT

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