BINDURA UNIVERSITY OF SCIENCE EDUCATION

DEPARTMENT OF NATURAL RESOURCES

KNOWLEDGE, ATTITUDES AND PRACTICES (KAP) ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES (*ADANSONIA DIGITATA)* IN NYANYADZI, ZIMBABWE

TAKUDZWA KNIGHT SITHOLE

(B202617B)

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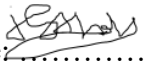
14 JUNE 2024

DECLARATION

I, Takudzwa Knight Sithole, hereby declare that I have read and understood the University's regulations regarding academic integrity and plagiarism. I affirm that this dissertation is my original work and has not been submitted elsewhere for academic credit.

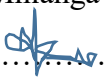
Student's Name: Takudzwa Knight Sithole

Student's Signature:  ……Date 03 October 2024

Supervisor's Name: Mr A Kundhlande

Supervisor's Signature: ……  ……Date 03 October 2024

Chairperson's Name: Mr W Mhlanga

Chairperson's Signature: pp……  ...Date 03 October 2024

DEDICATION

I dedicate this work to my loving family, whose unwavering support and encouragement have been my constant source of inspiration throughout this journey. Your belief in me and your sacrifices have propelled me forward, and I am forever grateful.

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ABSTRACT

This study aimed to evaluate the knowledge, attitudes, and practices of the local community in Nyanyadzi regarding the consequences of bark stripping on baobab trees (*Adansonia digitata* L.). The study was conducted from January 2024 to March 2024. The baobab tree (*Adansonia digitata* L.) is renowned for its distinct and iconic presence in various African regions. Bark stripping involves removing the tree's bark and has detrimental effects such as reduced fruit production, increased mortality rate, amplified susceptibility to diseases, amplified soil erosion, and human-wildlife conflicts. Raising awareness about sustainable practices in bark harvesting is crucial for the residents of Nyanyadzi. The research design was employed with both qualitative and quantitative. The questionnaires and interviews, administered to 85 participants selected from Ward 8. Data were collected using a multiple-phase design, followed by stratified sampling using the process of multiple-stage sampling. Convenient sampling was used to choose participants using the random sampling method. The data were entered into Microsoft Excel version 2016 and analysed using the Statistical Package for the Social Sciences (SPSS) version 20 of 2020, using descriptive statistics. The responses were categorised into good, fair, and poor, while binary logistic was employed to analyse the factors influencing the community's knowledge, attitudes, and practices. The results were presented through tables and graphs, with statistical analysis utilizing a 95% confidence interval and a significance level of 5%. The findings revealed an average knowledge score of 59.38%, indicating a varied level of understanding. Attitudes towards conservation and sustainability displayed an average score of 60.35%, while practices related to bark stripping scored 42.98%. These results emphasize the urgent necessity for educational interventions, community engagement, and sustainable mitigation strategies to address the adverse effects of bark stripping on baobab trees (*Adansonia digitata* L.).

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LIST OF ACRONYMS AND ABBREVIATION

CRDC……...Chimanimani Rural District Council

EMA……. Environmental Management Agency

FAES…… Faculty of Agriculture and Environmental Science

KAP……...Knowledge, Attitudes, and Practices

SPSS……. Statistical Package for Social Science

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The baobab tree possesses a distinctive look and holds significant value for indigenous communities (Venter and Witkowski, 2011). The bark of this tree is highly valued and employed for various purposes in African societies and even in European countries for crafting and medicinal processes (Buchmann *et al*., 2010). However, the practice of removing baobab bark for personal and commercial use can have detrimental effects, such as tree mortality and environmental deterioration, ultimately resulting in a decline in baobab species (Cissé *et al*., 2005).

The baobab tree, scientifically known as *Adansonia digitata*, is renowned as one of Africa's iconic trees and holds the distinction of being the largest succulent plant globally (Aida, 2016). This longstanding species bears fruits and possesses medicinal properties, making it highly valued for countless centuries. The baobab trees are particularly notable for their enormous size, earning them the title of the largest trees in the world. They can be found in various regions, including low-lying areas in mainland Africa, Madagascar, and partially in Europe and Australia. The species encompass the Giant Baobab (*Adansonia grandidieri*), Madagascar Adansonia (*Adansonia madagascariensis Baill*), *Adansonia rubrostipa Jum, Adansonia perrier Capuron, Adansonia suarezensis*, and *Adansonia za Baill* (Sidibe and Williams, 2002). In Zimbabwe and other parts of Africa, the baobab trees hold great cultural and traditional significance (Adekunle and Zhu, 2022).

The baobab tree possesses various distinctive characteristics, such as its ability to store significant amounts of water in its trunk. This makes it a crucial water source for animals during the dry season (Leach, van der Stege and Vogl, 2011). Traditional healers and royal families hold cultural significance for the deciduous baobab tree (Bamalli *et al.*, 2014).

The benefits of baobab have long been recognized, recent studies by Asongwa (2021), Adensina (2022), Fisher (2020), and Kassahun (2022) have focused on its conservation, as well as its impact on enhancing nutritional food ingredients, flavoring agents, and livelihoods. This recognition is vital to ensure the sustainable enjoyment of this resource by present and future generations. In the Lowveld of Zimbabwe, many people heavily rely on non-wood resources, leading to the overexploitation of baobab barks. These barks are used for making ropes, baskets, mats, medicines,

and hats, causing pressure on the trees and resulting in poor fruit production and diseases like black fungus (Sheillah *et al*., 2020).

The Nyanyadzi area ward 8 is familiar for its people who engage in baobab bark stripping as a means of livelihood. The objective of this research is to assess the knowledge, attitudes, and practices regarding the impact of bark stripping on trees and the environment.

1.2 PROBLEM STATEMENT

The Nyanyadzi area ward 8 is home to the impressive baobab species, known for their massive size and ability to withstand drought conditions. These mouth-watering plants are recognized as the largest in the world. Baobabs have long been cherished for their versatility, serving various purposes such as providing food, medicine, shelter, and bark for crafting. However, the escalating human population has led to a heightened demand for baobab crafts like ropes, mats, and medicines, exacerbating the overexploitation of bark and diminishing the number of baobab trees. Consequently, this has had detrimental effects, including soil erosion, reduced availability of food and medicine, decreased fruit production, increased tree mortality, the emergence of diseases like black fungus, and conflicts arising from habitat encroachment and human-monkey interactions during food-seeking behaviours, resulting in injuries to people. To effectively tackle this issue, it is crucial to gain a comprehensive understanding of the knowledge, attitudes, and practices (KAP) of individuals regarding the consequences of bark stripping.

1.3 JUSTIFICATION

The baobab tree holds significant ecological and economic importance in Africa, rendering it a highly revered and valuable resource for enhancing livelihoods. However, in the Nyanyadzi region, the number of baobab trees has declined, leaving them defenceless and scarce. This alarming trend indicates a rapid reduction in baobab populations within the area. Many baobab trees bear extensive scars around their trunks, exposing the vulnerable inner soft wood to the environment. This renders the trees susceptible to various threats, including diseases that impair fruit production and increase mortality rates. The baobab tree delivers invaluable ecosystem services and supports community livelihood diversification, underscoring the criticality of conserving this species for future generations. Bark stripping of baobab trees has led to conflicts between humans and monkeys. The majority of people rely on the tree for their livelihood, utilizing its leaves, roots, and fruits. Hence, the research aims to explore the knowledge, attitudes, and practices concerning the effects of bark

harvesting. This understanding is crucial for developing effective conservation strategies and promoting sustainable management of baobab trees. The finding will be going to target the Chimanimani Rural District Council, Local communities, Department of forestry and other stakeholder which are the arms of government to come up with better management practices and effective policies to address the problems.

1.4 AIM

1.4.1 This study aimed to assess the knowledge, attitudes, and practices on the effects of bark stripping on baobab trees in Nyanyadzi area Zimbabwe from January to March 2024.

1.5 OBJECTIVES

1.5.1 To determine the knowledge of people on the effects of bark stripping on baobab trees.

1.5.2 To evaluate the attitudes of people on the effects of bark stripping on baobab trees.

1.5.3 To determine the common practices used for baobab bark stripping.

1.6 RESEARCH QUESTIONS

1.6.1 To what extent do people possess knowledge about the effects of bark stripping on baobab trees?

1.6.2 What are the prevailing attitudes of people towards the effects of bark stripping on baobab trees?

1.6.3 What are the common practices being used to harvest baobab barks?

CHAPTER 2: LITERATURE REVIEW

2.1 CHARACTERISTICS OF BAOBAB

The baobab tree, a deciduous species, possesses a shallow spreading root system and a robust trunk that can store water for extended periods. Its distinctive appearance, with root-like branches, has earned it the nickname "upside down" tree. Belonging to the *Adansonia* genus in the Malvaceae family and Bombacaceae subfamily, the baobab tree is one of the nine global species (Venter and Witkowski, 2013). The widely used common name "baobab" is believed to have originated from the Arabic term "buhibab," meaning fruit with many seeds (Diop *et al*., 2005).

Baobab trees can reach a mature height of 25 meters, with trunk diameters ranging from 6 to 10 meters (Chadare *et al*., 2009). Carbon dating methods have estimated that these trees can live up to 1,000 years (Gebauer *et al*., 2002). However, determining their age can be challenging since baobab trees do not produce annual rings (Wickens and Lowe, 2008). Radio dating of a baobab tree in Namibia revealed an age of 1,272 years (Patrut *et al*., 2007). Interestingly, previous research by Woodborn *et al*., (2010), as cited by Mpofu *et al*., (2012), showed that the largest baobab trees are not necessarily the oldest, as medium-sized individuals can also be ancient. Estimating age based on size becomes more complex as a result.

There are also some other species apart from *Adansonia digitata*, a natural to Africa, there is also Australian baobab, *Adansonia gibbosa, Adansonia cunni*, and six other baobab species native to Madagascar namely *Adansonia grandidieri* Baill, *Adansonia madagascariensis* Baill, *Adansonia rubrostipa* Jum & H. Perrier, *Adansonia perrier* Capuron, *Adansonia suarezensis* H. Perrier and *Adansonia za* Baill (Sidibe and Williams, 2002). The ninth species discovered in Namibia through morphology, ploidy, and molecular phylogenetics is *Adansonia kilima* sp. nov. (Pettigrew *et al.*, 2012). *Adansonia kilima* was found to be phenotypically related to *Adansonia digitata* though differentiated based on floral morphology, pollen characters, and DNA (Pettigrew *et al.*, 2012).

According to PhytoTrade (2008), it is estimated that there are around 28 million baobab trees in the southern African region. These indigenous baobab trees are distributed across approximately 93,000 square kilometers of land, spanning eight countries. The countries with the largest baobab populations include Mozambique, South Africa, Malawi, and Zimbabwe. Table (2.1) provides a breakdown of the occurrence of baobab trees in the countries of southern Africa.

The baobab tree holds a smooth bark, which can range in colour from reddish-brown to grey, and has a soft and fibrous texture (Diop *et al*., 2005). When baobab trees are young, their leaves are simple, but as they mature, they develop compound leaves consisting of 3 to 9 leaflets (Van Wyk, 2013). Baobab trees produce white flowers during both the dry and wet seasons. Typically, it takes 8 to 23 years for a baobab tree to reach maturity and start flowering (Wickens and Lowe, 2008). However, studies focused on domesticating baobab trees have revealed that maturity can be achieved in six years through vegetative propagation methods and genetic improvement (Sanchez, 2011).

The African baobab tree is well-suited to arid and semi-arid conditions found in various regions of Africa, including the western, north-eastern, central, and southern parts (Sidibe and Williams, 2002). It naturally occurs in most African countries located south of the Sahara Desert and is particularly associated with drier areas within the savannah biome where the minimum annual rainfall is 300mm. These trees can be found in regions between 16^{o} N and 25^{o} S latitudes, where frost occurs for no more than one day per year (Kamatou *et al*., 2011). Baobab trees thrive in alluvial soils but are sensitive to waterlogging and deep sands (Jensen *et al*., 2011).

Table 2.1: Estimated occurrence of baobab trees in southern Africa (PhytoTrade, 2008).

Country	**Total land area of the country(km^2)**	**Areas of baobab occurrence**	**Estimated baobab coverage as% of country's total land area (%)**	**Estimated land area baobab population (km^2)**
Botswana	582000	Hard area in north-east and northwest	1	5820
Malawi	118484	Shire valley, nsanje	10	11848

Mozambique	801590	By lake Malawi, Chipanga, Magude, Cabo Delgado, Nnampula provinces,	5	40080
Namibia	825000	Northern Namibia	0.5	4125
South Africa	1233404	Limpopo basin, northern Zoutpansberg mountains, Limpopo and Mpumalanga provinces	1	12334
Zambia	752615	Luangwa, Gwembe valley, Zambezi valley	1	7526
Zimbabwe	390580	Zambezi valley, save valley, Limpopo basin	3	11717
TOTAL	4703673			

2.2 BAOBAB TREE UTILISATION IN AFRICA

2.2.1 WEST AFRICA

Buchmann *et al*., (2010) discovered a diverse range of traditional uses for the baobab tree across 11 ethnic groups and four ecological zones in Benin, Mali, Burkina Faso, and Senegal. They identified a total of three hundred uses for the baobab tree within these regions. The fruits and leaves of the baobab tree are consumed throughout the year, and the seeds are utilized as ingredients in a fermented mixture known as 'maari' (Porkouda *et al*., 2010). This study explored the

fermentation of baobab seeds using bacteria, which proved to be an economical method for producing a food-thickening agent. Private organizations such as SAFRUIT and NUTREE have been involved in projects in Mali, Burkina Faso, and Niger, to improve poverty in local communities through the sustainable utilization of baobab trees. These projects focused on baobab trees' conservation, breeding, and propagation (Svejgaard *et al*., 2011).

2.2.2 BAOBAB TREE UTILISATION IN SOUTHERN AFRICA

The baobab tree fruit pulp is common among rural households in southern Africa. In Malawi, the baobab fruit pulp is used as a substitute for cereal and to make fruit juice mixed either with water or fresh milk (Sanchez, 2011). Juice-making industries are buying baobab fruit pulp to make frozen juice sold as ice lollies introducing baobab tree product consumption into urban communities of Malawi. In Namibia, the baobab fruit pulp is used for subsistence by cash-stricken households (Kamatou *et al*, 2011). In South Africa, the baobab tree population is restricted to the Limpopo and Mpumalanga provinces (Kamatou *et al.*, 2011). Rural communities in these provinces use the baobab fruit pulp to make juice mixed with water or fresh milk (Vermaak *et al.,* 2011). Traditional healers use the bark to treat diarrhoea, dysentery and measles (Bamalli *et al.,* 2014). The existence of a large population and poverty within the region results in reduced numbers of baobab due to the removal of barks to make hats and medicines leading to a high mortality rate (Erb, 2004 and Watson, 2007). The inner bark of the baobab trunk yields a strong and durable fibre. In Sudan, the bark is stripped off on the lower part of the tree trunk and used for the production of string and cordage which is used to cover furniture, such as the traditional rope stool and traditional rope bed (Orwa *et al*., 2009). In addition, fibre from the bark is used for making musical instruments and is a more valuable resource for various products (Orwa *et al*., 2009).

In Kenya, the fibre is used for making the famous ‘kiondo’ baskets. The baobab trunks show the intensive scars of debarking on the tree and bark harvesting still existing in Sudan (Orwa *et al*., 2009). Furthermore, *Adansonia digitata* bark is used as a food ingredient or flavouring agent. The inner bark is ground into a powder and added to porridge, soups, stews, and beverages. It provides essential nutrients in food (Stucher and Lopez-Grunn, 2015). The bark demand has increased worldwide because of the ingredients used in cosmetic industries (Rahul *et al*., 2015).

In Zimbabwe, the uses of the baobab tree primarily focus on its fruit, seeds, and fibrous bark. Similarly, to other southern African communities, in Zimbabwe, the fruit pulp is mixed with water

or fresh milk to create a juice is consumed as a beverage or frozen into ice lollies (Chipurura and Muchuweti, 2013). The seeds are roasted and ground into a powder that serves as a coffee substitute (Sanchez, 2011; Chipurura and Muchuweti, 2013). The inner bark is also ground into a powder and added to porridge, soups, stews, and beverages (Stucher and Lopez-Grunn, 2015). Additionally, craft items such as hats, mats, and wallets made from baobab fibre have been exported from Zimbabwe to South Africa since the early 1990s, contributing to livelihood security in the semi-arid regions of Zimbabwe (Wynberg *et al*., 2012).

2.2.3 LOW PRODUCTION LEVEL

The production of baobab products, such as fruit pulp, seeds, and bark, is limited within society. Inadequate transportation of water and nutrients due to scars on the tree trunk, which expose the tree to direct sunlight, contribute to suboptimal fruit and bark production in developing countries (Okop *et al*., 2019). The quality and quantity of these baobab products are characterized as low (De Caluwe and Van Damme, 2011), which can discourage consumers and reduce local and international market demand. Several factors hinder the utilization and marketability of baobab products. Cultural beliefs, like in Kenya where baobab products such as "mabuyu sweets" are associated with food for the less privileged, can undermine consumer preferences and market demand (Kiprotich *et al*., 2019). Limited awareness and knowledge about baobab products, as reported in Nigeria (Omotesho *et al*., 2013) and Kenya (Kiprotich *et al*., 2019), also contribute to this challenge. Negative attitudes towards sustainable bark harvesting and a lack of interest in bark regeneration serve as additional barriers (Darr *et al*., 2020). These attitudes may arise from limited consumer awareness and understanding of the various benefits of consuming baobab bark (Borelli *et al*., 2020).

2.3.4 NUTRITIONAL VALUE OF BAOBAB PRODUCTS

For centuries the baobab tree products have been used as a buffer during food shortages or drought (Wicken and Lowe, 2008). The fruit of baobab is used as food and bark for medicinal purposes because it contains calcium for the maintenance of strong bones and teeth (Jackson and Maldonado, 2015). According to Porkouda *et al.,* (2010), the baobab fruit pulp is very rich in vitamin C. In support, Ramadhani (2002) stated that the baobab fruit pulp contains ten times the vitamin C content compared to the same weight of oranges. The fruit pulp contains 50% crude fibre, so it is an ideal fibre supplement (Jackson and Maldonaldo, 2015). Vermaak *et al.,* (2011) cited the

presence of magnesium, phosphorus, and vitamin C in the baobab fruit and barks to promote health to the people.

2.3 ECOLOGICAL IMPACTS OF BARK STRIPPING

The removal of bark from baobab trees exposes the inner soft wood to direct sunlight, making the tree susceptible to damage, diseases like fungi, and pests. This weakens the tree's health, leading to an increased mortality rate and poor fruit production (Munyebvu *et al*., 2018). Recent estimates indicate that approximately 805 million people worldwide suffer from chronic undernourishment, with 162 million children under the age of five experiencing stunted growth, particularly among impoverished families in rural areas (UNICEF, 2016). Among the 21 countries with high rates of child stunting, 15 are located in sub-Saharan Africa. This alarming situation coincides with the rapid loss of biodiversity, the destruction of wildlife habitats, and the decline in ecosystem services such as carbon sequestration and soil enrichment (Gebauer *et al*., 2016). During periods of agricultural crop shortfalls, many people rely on the fruits and bark of forests for sustenance (FAO, 2014).

The majority of debarked baobab trees are mature, as they are believed to have high-quality fibre and fruits. Other studies have shown that bark harvesting has a negative impact on baobab tree populations. In southern Malawi, 68% of sampled baobab trees had been debarked, while the percentages were 97% in Zimbabwe and 90% in Burkina Faso. This increased debarking vulnerability has led to the spread of sooty disease among the trees (Romero *et al.*, 2014; Schumann *et al*., 2010). Bark stripping occurs at a faster rate than the trees' ability to regenerate bark, resulting in reduced productivity and low-quality fibres, as well as a decline in the baobab population. This forces harvesters to target other parts of the tree, leading to further injuries (Munyebvu *et al*., 2018). Additionally, mature trees are more affected by diseases than young ones, with fungus, canker, dieback, and sooty diseases being the main causes of baobab tree mortality (Sheillah *et al*., 2020).

2.4 ECOLOGICAL IMPORTANCES OF BAOBAB TREE

The baobab tree has been known as one of the top five indigenous fruit tree species that significantly contribute to the livelihoods of rural communities in the Southern African Development Community (SADC) region (Venter and Witkowski, 2011). The barks of baobab trees serve as a source of food and nutrition for animals, including elephants, and can also be ground into powder for various purposes. Additionally, baobab trees play a vital role in reducing soil erosion, providing shelter and shade through their canopies, and supporting microhabitats for other organisms within the ecosystem (Wickens and Lowe, 2008).

The shade provided by baobab trees is used by wild animals and livestock, particularly during hot periods of the day. These animals contribute to the ecosystem by leaving manure around the tree trunks, enriching the soil with nutrients and serving as a food source for other organisms in the food chain (Wickens and Lowe, 2008; Venter and Witkowski, 2011). Hollow baobab tree trunks serve as homes for wild animals, and in homesteads, they are used for storage purposes. Baobab trees produce large white flowers at the onset of the rainy season, which are pollinated by bats and small animals, highlighting the importance of protecting these pollinators to ensure fruit production (Venter and Witkowski, 2013). However, baobab trees are also adapted to wind pollination (Mpofu *et al*., 2012), and when flowers and leaves fall to the ground, whether fresh or dry, they become a source of food for animals such as cattle, goats, and wildlife (Wickens and Lowe, 2008).

The baobab tree's ability to withstand extreme stress during drought and regenerate its bark allows it to survive in periods of limited or no rainfall while still producing fruits (Stucher and Lopez-Grunn, 2015). Given the climate variability and change, the resilience of the baobab tree is of great ecological importance as it continues to provide essential ecosystem services. Its spongy fibrous stems are resistant to wildfires (Mpofu et al., 2012; Chadare et al., 2009). In SADC communities, cultural beliefs and customs prohibit the cutting of baobab trees, leading farmers to preserve and protect these trees on their land, whether it is around homesteads or agricultural areas, as they hold significance for royal families (Venter and Witkowski, 2011).

2.5 SUSTAINBLE MANAGEMENT OF BAOBAB TREE

There was a sense of uncertainty among many villagers regarding the future availability of baobab bark. Their concerns were based on the observation that trees were not being replanted after being disturbed by people during bark harvesting. To address this issue and provide more formal

employment opportunities, management strategies were implemented to reduce the dependence of families on craft-making for income and promote baobab tree planting (Munyoro, 2023). The governance of natural resources is typically driven by various factors, including legal obligations (Mandondo, 2006) and the need for ecological sustainability (Kozanayi *et al.*, 2014). The effective management of natural resources involves closely monitoring bark regeneration rates (Peters, 1996) and assessing the unforeseen impacts of harvesting, as well as environmental factors like sooty baobab disease and drought.

The results obtained from monitoring should inform adjustments to the annual harvest and harvesting cycles, forming the basis for an adaptive management approach. Granting local communities and stakeholders the right to manage baobab bark resources is crucial for conservation and sustainable practices, as it provides insights into the significance of bark for the tree and its products (Theron, 1998). The Chimanimani Rural District Council has developed laws that prohibit the harvest of baobab bark, and the enforcement of these rules is carried out by traditional leaders (Nhira *et al.*, 1998). While all villagers agreed that harvesters are capable of regulating compliance with the laws, there is recognition that some individuals may not adhere to the rules.

CHAPTER 3: METHODOLOGY

3.1 DESCRIPTION OF THE STUDY AREA

Nyanyadzi communal area is situated 96km to the south of Mutare along the main Mutare-Birchenough Bridge Road (figure 3.1). It lies at an altitude of 1,064 meters above sea level and has geographical coordinates of 19° 46' 0" South, 32° 25' 0" East in Natural Region V. Nyanyadzi falls within Ward 8 of Chimanimani District (Mugangavari, 2019). The study area is characterized by low annual precipitation, averaging 334 mm, high temperatures, low relative humidity, and frequent episodes of intense but short-lived rainfall. The predominant soil types in the region are deep alluvial soils, with occasional occurrences of shallow gravelly soil (Joubert, 2013).

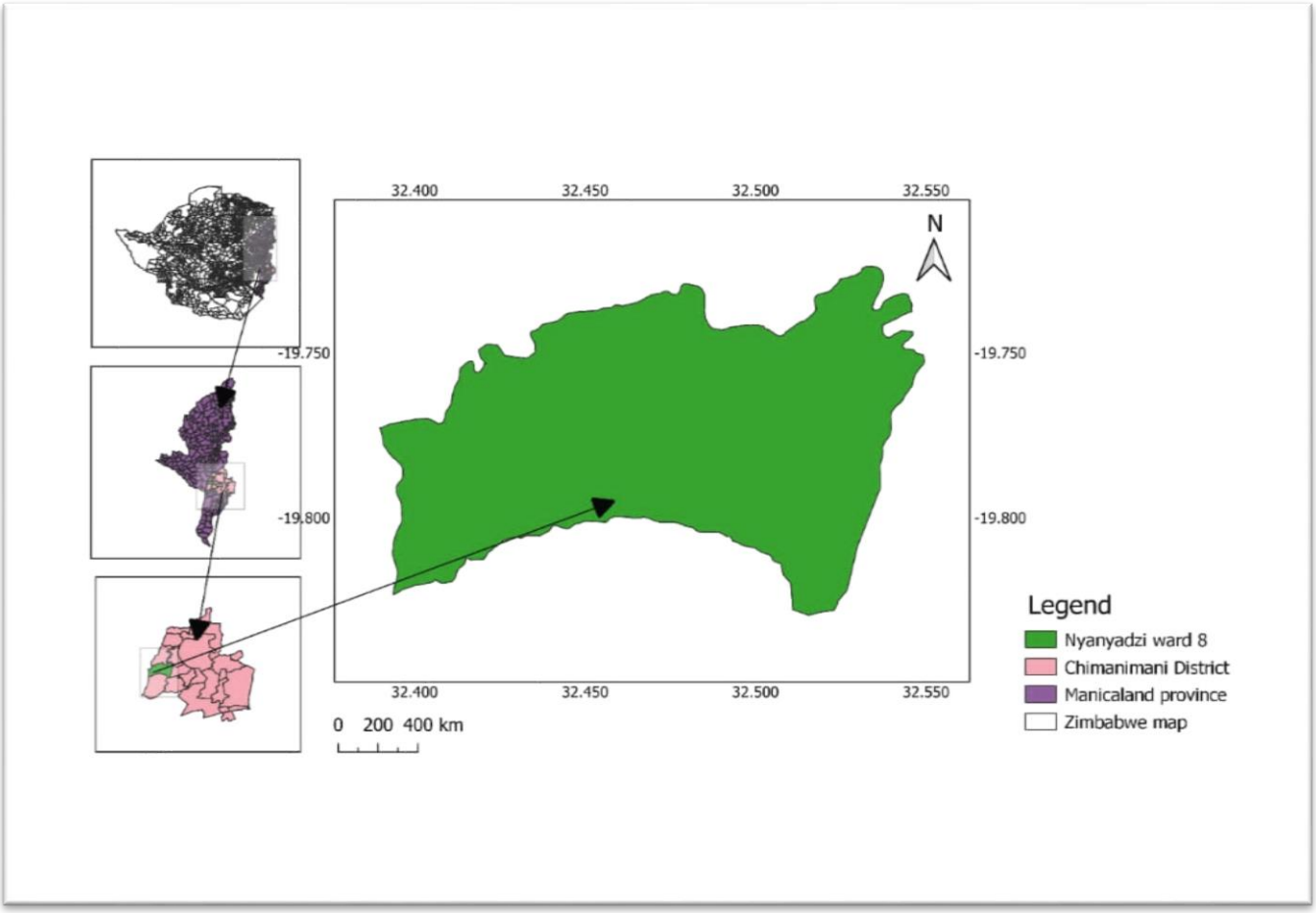

Figure 3.1: A Map showing Nyanyadzi Area Ward 8 in Chimanimani District

3.2 STUDY DESIGN

To collect a significant amount of data and facilitate cost-effectiveness, the researcher employed a cross-sectional study, which allowed for the simultaneous capture of multiple factors and the generation of new ideas (Hlahla, 2023). Both qualitative and quantitative

methods were used to analyse the survey data, considering the descriptive nature of the study. A total of 85 participants were selected using simple and practical random sampling methods. The researchers utilized the (KAP) survey questionnaire to obtain insights into the knowledge, attitudes, and practices of the respondents regarding the impacts of bark harvesting on baobab trees.

3.3 DATA SOURCES

The student utilized both primary and secondary data sources in their research. Primary data refers to original data gathered directly from participants through interviews and questionnaires. The main sources of primary data included the Chimanimani Rural District Council, village heads, the Environmental Management Agency, and the participants themselves. On the other hand, secondary data refers to pre-existing data that was collected and made available for the researcher's use, such as literature reviews obtained from sources like E-Journals. To collect the data, the student employed semi-structured questionnaires.

3.4 SAMPLING METHOD AND SAMPLE SIZE

The researcher employed a multi-phase design sampling strategy to address the large population in Nyanyadzi Ward 8. Firstly, the population was divided into smaller groups or strata, and then samples were taken using a process known as multiple-stage sampling. The Nyanyadzi community, with its significant population, was initially divided into 9 distinct villages within Ward 8. In addition, the second step, convenience sampling was used by the researcher to select six specific villages: Mutsiyo, Chishakwe, Dirikwe, Makotamo, Ngazwane, and Masasi. Convenience sampling was chosen because it allows for data collection from easily accessible individuals (Lee and Landers, 2022). This method is efficient, equitable, and cost-effective. Furthermore, in the selection of the 85 respondents, the researcher employed simple random sampling, ensuring that every member within the chosen villages had an equal chance of being chosen.

3.5 RESEARCH TOOLS

The Nyanyadzi communities were surveyed using questionnaires, which are research tools designed to gather participants' responses (HR and Aithal, 2022). These questionnaires comprised of a sequence of questions of various types. To capture data on knowledge, attitudes, and practices concerning the effects of bark harvesting on baobab trees, a semi-structured questionnaire design was employed. The questionnaires were written in English and then translated into the local language (Shona) by the researcher. The researcher manually

distributed open-ended and closed-ended questionnaires with 25 questions to the target individuals in the selected villages. The researcher patiently awaited the respondents' survey responses. The questionnaire comprised 4 sections: Section A focused on sociodemographic characteristics with 5 questions, Section B consisted of 6 questions about knowledge, Section C contained eight questions exploring attitudes, and Section D included 6 questions regarding common bark stripping practices. In addition, to the questionnaires, the researcher conducted key informant interviews in Nyanyadzi, involving participants such as village heads, the Environmental Management Agency, and the Chimanimani Rural District Council. These interviews were guided by open-ended questions derived from the questionnaire to gather relevant information and generate meaningful results.

3.6 RELIABILITY AND VALIDITY OF RESEARCH INSTRUMENTS

The researcher examined the results' consistency with other measures of the same concept and known theories over time, among different observers, and across various test sections to determine their reliability and validity (Fraenkel and Wallen,2003). To increase validity, families were chosen at random.

3.7 ETHICAL CONSIDERATIONS

The researcher obeyed the ethical guidelines outlined in the declaration of Helsinki when involving human and animal subjects. The researcher obtained approval from their supervisor, the FAES Chairperson and the Chimanimani Rural District Council to conduct the study. Before participation, all individuals provide informed consent after being fully informed about the study objectives and procedures. The researcher prioritized privacy during data collection and did not discriminate against participants based on race, colour, ethnicity, or socioeconomic status. Participants willingly agreed to take part in the research without any form of force or pressure. They were also informed that they could withdraw from the study at any time without a reason. To protect privacy, the researcher confirmed that the collected responses did not contain any identifiable information such as names, Identification card number and addresses.

3.8 METHODS OF DATA ANALYSIS

Data were analysed using descriptive statistics available in Statistical Package for the Social Sciences (SPSS) version 20 software. The researcher's questionnaire consisted of 6 questions to assess participants' knowledge, 8 questions to evaluate attitudes, and 6 questions regarding common practices related to bark stripping. Each correct answer was assigned a score of 1, while unselected answers received a score of 0. Responses were categorized as 'Good' if the

average score was above 70%, 'Fair' if it fell between 51-69%, and 'Poor' if it was below 50%. The data were presented using tables, pie charts, and graphs.

CHAPTER 4: RESULTS

4.1 DEMOGRAPHY

Table (4.1) the respondents who participated in the survey where people aged 34-41 years had the highest percentage of (21.2%), also17 individuals (20%) are in the age group of 42-49 years, 50- 57 years indicates 14 (16.5%), whilst 18-25 years, 26-33 and 58+ had the lowest percentage of (14.1%) with 14 individuals each. The employment status of people who are being employed were 25 (29.4%) and unemployed has the largest number of individuals were 60 (70.6%). Most participants attended the secondary level with 51 (60%) and then tertiary, primary had the least 17 participants each which gives a similar percentage of (20%).

Table 4.1: Demographic variables of participants of knowledge, attitudes and practices on the effects of bark stripping on baobab trees.

Demography variables	**Category**	**n=85**	**%=100**
Age	18 - 25 years	12	14.1
	26 - 33 years	12	14.1
	34 -41 years	18	21.2
	42 - 49 years	17	20.0
	50 - 57 years	14	16.5
	58+	12	14.1
Employment	Employed	25	29.4
	Unemployed	60	70.6
Education Level	Primary	17	20.0
	Secondary	51	60.0
	Tertiary	17	20.0

Figure 4.1 shows females were found as the highest number with 46 participants (54%) and males were 39 (46%).

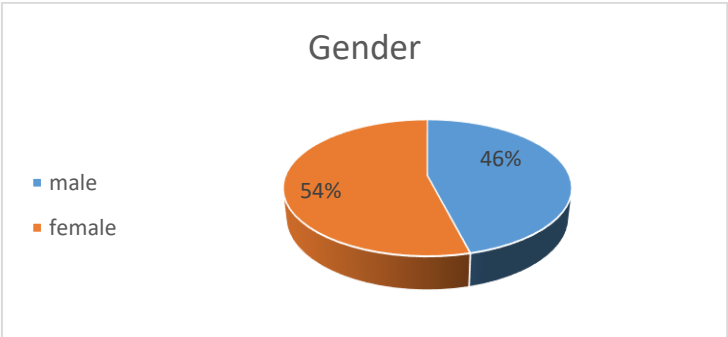

Figure 4.1: Gender respondents on the effects of bark stripping on baobab trees.

Figure 4.2 shows the duration of being a resident, 11-20 years has the majority of 34 respondents (40%), followed by above 21 years of being a resident with individuals 33 (38.8%) and 0- 10 years the lowest of 18 individuals with (21.2%).

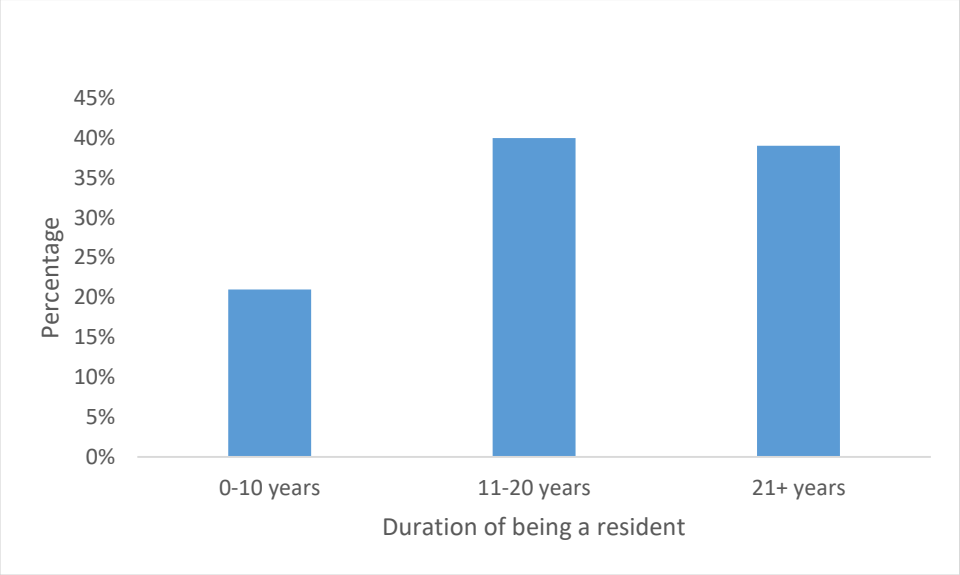

Figure 4.2: Time taken as a resident in the community in years.

4.2 KNOWLEDGE ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES

Table (4.2) provides information about the level of knowledge participants have on the effects of bark stripping on baobab trees in the Nyanyadzi Communal area in Chimanimani District. The total score of knowledge was 8.907 and it was divided by 15 respondents to give a 0.5938 which is further multiplied by 100% to give the total knowledge percentage of 59.38% which is fair.

The majority of respondents know about the baobab trees with (100%) knowledge. (82.4%) of barks have the highest use to make ropes, followed by medicine (65.9%), followed by hats (29.4%), mats (28.2%), and lastly wallets (22.4%). The participants who can understand what barking stripping is are (100%). (87.1%) of the participants, they were aware of the effects of baobab bark stripping, and (12.9%) did not know the effects of bark stripping. The majority of the participants knew the specific effects of bark stripping (76.5%) diseases from the trees which were debarked, (74.1%) increased mortality rate, poor fruit production (50.6%), and some participants they even don't have any idea about the specific effects (12.9%).

The research findings show that (83.5%) of the participants experienced soil erosion as the environmental problem caused by baobab bark stripping, also (28.2%) experienced river siltation, (47.1%) gullies formation and those who had no idea (14.1%).

The sampled population shows that people have a reasonable knowledge on the effects of bark stripping on baobab trees. However, some do not know the effects of baobab bark stripping.

Table 4.2: Knowledge on the effects of bark stripping on baobab trees.

Knowledge variables	**Participants response**	**n=85**	**%**	**score**
K1 Do you know what baobab trees are?	Yes	85	100	**1.0**
	No	0	0	
K2 If yes, what are the uses of baobab bark in your community?	Mats	24	28.2	**0.282**
	Hats	25	29.4	**0.294**
	Medicine	56	65.9	**0.659**
	Ropes	70	82.4	**0.824**
	Wallets	19	22.4	**0.224**
K3 Explain what you understand by bark stripping	Able to explain	85	100	**1.0**
	Unable to explain	0	0	
K4 Do you know the effects of baobab tree bark stripping?	Yes	74	87.1	**0.871**
	No	11	12.9	
K5 If yes, what are the specific effects on the trees?	Poor fruit production	65	50.6	**0.506**
	Increased diseases	43	76.5	**0.765**
	Increased mortality rate	63	74.1	**0.741**
	No idea	11	12.9	
K6 What are the environmental problems caused by baobab tree bark stripping?	Soil erosion	71	83.5	**0.835**
	River siltation	24	28.2	**0.282**
	Land degradation	13	15.3	**0.153**
	Gullies formation	40	47.1	**0.471**
	No idea	12	14.1	

Total Score				**8.907**

4.3 ATTITUDES ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES

Table 4.3 presents information on attitudes towards the effect of baobab bark stripping. The total attitude score was 7.845, divided by the number of participants (13), resulting in 0.603. This value was then converted to a percentage by multiplying it by 100%, giving a score of (60.35%), which is considered quite fair.

Regarding the participants' interest in learning about sustainable bark harvesting, the majority showed a high level of interest (56.5%), followed by a moderate level of interest (37.8%), and a smaller percentage indicated no interest (4.7%). Most participants were aware of the negative consequences of bark stripping for local communities (87.1%), while a small portion was unaware (12.9%). Human-monkey conflicts were seen as the most significant negative impact of bark stripping (48.2%), followed by house destruction due to heavy wind (48.2%), land degradation (23.5%), and a small percentage indicated they were unsure (12%).

The main drivers of bark stripping were identified as poverty (84.7%) and unemployment (35.3%). The participants expressed full support for conservation and sustainable management of baobab trees (100%). When asked who should be involved in resolving the issue of bark stripping, the majority indicated all stakeholders (76.5%), followed by the government (16.5%), and the community (7.1%).

Most participants agreed that they were coping with the problems caused by bark stripping (97.6%), while a small percentage stated they were not coping (2.4%). In terms of awareness of community reactions towards the problem, the majority were highly aware (51.8%), followed by a fair amount of awareness among individuals (37.6%), a small percentage with limited awareness (3.5%), and a few participants who had no idea (7.1%).

Based on Table 4.3, respondents demonstrated a strong interest in learning more about the sustainable management of baobab trees. They recognized the importance of these trees as a source of income, particularly since many of them were unemployed and relied on crafts for their livelihoods.

Table 4.3: Attitudes on the effects of bark stripping on baobab trees.

Attitudes on the effects of bark stripping on baobab trees	**Participants response**	**N=85**	**%**	**Score**

A1 What level of interest do you have in learning more about sustainable bark stripping?	Very interested	48	56.5	**0.565**
	Somehow interested	32	37.8	**0.375**
	Not interested	4	4.7	
	I don't know	1	1.2	
A2 Do you think that baobab trees bark stripping has negative consequences for the community?	Yes	74	87.1	**0.871**
	No	11	12.9	
A3 If yes, what are the consequences to the community?	Human monkey conflict	41	48.2	**0.482**
	Destruction of houses	41	48.2	**0.482**
	Land degradation	20	23.5	**0.235**
	No idea	10	12	
A4 What are the major drivers of baobab bark stripping in your community?	Poverty	72	84.7	**0.847**
	unemployment	30	35.3	**0.353**
A5 Do you support efforts to conserve baobab trees and manage their resources sustainably?	Yes	85	100	**1**
	No	0	0	
A6 Who, in your opinion, ought to be in charge of resolving the problems associated with baobab tree bark stripping?	All stakeholders	65	76.5	**0.765**
	Government	14	16.5	
	Community	6	7.1	
A7 Is the community making every effort to cope up with the problems of baobab bark stripping?	Yes	83	97.6	**0.976**
	No	2	2.4	
A8 If yes, to what extent are you aware of the community's reaction towards the problems?	A great deal	44	51.8	**0.518**
	A fair amount	32	37.6	**0.376**
	Not much	3	3.5	
	I do not know	6	7.1	
Total Score				**7.845**

4.4 PRACTICES ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES

Table (4.4) presents the common practices on the effects of bark stripping on baobab trees. The average score of common practices on the effects of baobab bark stripping is 5.588, divided by 13 respondents to get 0.429. The number 0.427 converted to a percentage of (42.98%), the total common practice on the effects of bark stripping.

The majority of the respondents participated in the survey practices bark stripping 76 individuals (89.4%) and those who were not into practices were 9 individuals (10.6%). The percentage of those who engaged in practice once every year (11.8%), (40%) of those who did twice every year, (37.6%) who engaged in practices many times every year and some didn't engage in practices (10.6%). A large population uses axes for bark stripping (87.1%), followed by knives (27.1%), followed by hummers (21.2%) and lastly, some don't have any idea of what is being used to bark strip (9.45%). Among the common practices used to reduce the effects of baobab bark stripping avoiding stripping right around the tree (38.8%), (25.9%) stripping on the southern part of the tree, harvesting small sections of the tree (17.6%), and also (17.6%) of pruning large branches. Most people they are aware of the regulations and guidelines regarding bark harvesting (92.9%) and fewer were not aware of anything (7.1%). The population that followed the guidelines and regulations were fewer (41%) than those who didn't follow (44%).

Table 4.4: practices on the effects of bark stripping on baobab trees.

Practices on the effects of bark stripping on baobab trees	**Participants response**	**N=85**	**%**	**Score**
P1 Have you ever personally stripped bark from a baobab tree?	Yes	76	89.4	**0.894**
	No	9	10.6	
P2 If yes, how often do you engage in this practice?	Once	10	11.8	**0.118**
	Twice	34	40	**0.40**
	Many times	32	37.6	**0.376**
	I'm not into practice	9	10.6	
P3 What methods do you use to strip bark from baobab trees?	Axe	74	87.1	**0.871**
	Knife	23	27.1	**0.271**
	Hummer	18	21.2	**0.212**

	No idea	8	9.4	
P4 What are the common practices used to reduce the effects of baobab bark stripping?	Avoiding stripping right round the tree	33	38.8	**0.388**
	Stripping on the southern part of the tree	22	25.9	**0.259**
	Harvesting small section of the tree	15	17.6	**0.176**
	pruning large branches	15	17.6	**0.176**
P5 Are you aware of any regulations or guidelines regarding baobab bark harvesting in your community?	Yes	79	92.9	**0.929**
	No	6	7.1	
P6 If yes, do you follow these regulations or guidelines?	Yes	41	48.2	
	No	44	51.8	**0.518**
Total Score				**5.588**

CHAPTER 5: DISCUSSION

5.1 KNOWLEDGE ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES

The knowledge of individuals regarding the effects of baobab bark stripping was found to be 59.38%, which is considered fair. This percentage was obtained by dividing the average knowledge score (8.907) by the total number of respondents (15) and then multiplying by 100% to represent the overall knowledge level. In comparison to a study conducted in Southern Mozambique, over half of the participants (90.3%) were aware of the specific effects of bark stripping (Naah *et al*., 2017). The disparity in knowledge between the studies could be attributed to differences in educational attainment between the two countries, as people in Mozambique seem to possess more knowledge regarding the effects of bark stripping on baobab trees because they received much education about the effects of bark harvesting.

The majority of the participants (100%) demonstrated knowledge about baobab trees, with percentages indicating awareness of their use in making mats (28.2%), hats (29.4%), medicines (65.9%), and ropes (82.4%). In contrast, a study conducted in Nigeria reported a lower percentage (31.4%) for medicinal use of barks (Tamuno *et al*., 2016), while another study mentioned a higher percentage (43%) for medicinal purposes (Fakaye *et al*., 2009). In a report encompassing southern and eastern Africa, the use of barks for medicinal purposes was recorded at 36.7% (Maroyi, 2014). The variation in knowledge and demand for traditional medicines contributes to differences in medicinal use. In Nyanyadzi, poverty serves as the primary driver for the conventional use of bark as medicine, as people have easy access, affordability, and availability of traditional healthcare options. Previous studies in Kenya's Makueni region indicated a (45%) involvement in crafting ropes using bark fiber (Fischer *et al*., 2020), which significantly differs from the current study's findings of 82.4%. This discrepancy can be attributed to the increased population in Nyanyadzi villages that rely on bark for their production and livelihoods. The population utilizes ropes as threads during wheat harvesting and thatching, thereby increasing the demand for ropes.

The participant respondents demonstrated knowledge of the specific effects of bark stripping on trees, with percentages indicating awareness of diseases (76.5%), mortality rate (74.1%), and poor fruit production (50.6%). In contrast, studies conducted in Southern Africa, specifically in Malawi (68%) and Burkina Faso (90%), reported a higher prevalence of trees affected by sooty diseases (Fischer et al., 2020). In Kenya, the majority relies on baobab fruits for their livelihoods, processing juice, and grinding seeds for coffee. Debarking in Kenya adversely affects baobab fruit production (69%) (Fischer *et al*., 2020), compared to Nyanyadzi,

where it is (50.6%). Moreover, this information indicates that a significant number of people in Kenya engage in bark harvesting, resulting in higher mortality rates and reduced fruit production. Bark harvesting leaves the tree vulnerable to diseases, leading to tree death. The scars on the tree hinder water movement within the tree, thereby hindering tree production as the xylem fails to reach the tree branches.

In the study, more than half of the participants (83.5%) were aware of soil erosion as an environmental effect of bark harvesting, while (47.1%) identified river siltation. These findings were lower than those reported in Sudan, where (85%) of participants recognized soil erosion (Robinson, 2005). The differences in results could be attributed to variations in the geographical location of the trees.

5.2 ATTITUDES ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES

From the study, the average score for attitudes toward the effects of bark stripping is (60.35%) which is quite fair. Participants were very interested in learning more about sustainable bark harvesting (56.5) of the respondents but in the study conducted in the Zimbabwe Mutambara area about (60%) of people wanted to protect their baobab for future use which is slightly higher than the Nyanyadzi community (Romero *et al.*, 2001). The lines between the 2 studies might be an effort to protect their resources for future generations.

Debarking of baobab trees has consequences for the community where they are a significant increase in human-monkey conflicts (48.2%) caused by the decline of baobab trees. The deterioration of baobab trees resulted in limited food animals due to over-harvested by people in contrast with the study findings in Namibia suggested that human-wildlife conflicts are lower (33%) (Munyebvu *et al*., 2018). The differences might be due to the closeness to sanctuaries. Nyanyadzi community is close to Save Sanctuary, animals depend on baobab leaves, fruits and barks, and due to the decline of trees, they lose their habitat and food thereby invading people's fields. The major driver for bark stripping within the community is poverty (84.7%). Moreover, the results contradict those of participants in Botswana (67%). The lines between the two studies might be caused by the country's level of education or a better economy. The country with more people employed will have less number of people engaged in bark harvesting because of their profession.

The participants support the efforts to conserve and manage baobab sustainably (100%), whilst, in the study from Southern Mozambique, more than half of the respondents made an effort to preserve and manage the resources sustainably (93.4%) (Enkoro *et al.*, 2019). The differences

were because in Nyanyadzi they followed some bylaws made by the community for the conservation of trees. More than half of the respondents argue that All stakeholders (75.5%) should be involved in managing baobab trees including traditional leaders as mentioned in the Traditional Leaders Act, the government (16.5%), Non-governmental organizations and the community itself. In the previous research sustainable management of baobab resources involved the Forest Commission and also delegated authority to the communities to conserve the resource (Lynch and Alcorn, 2004; Neumann, 2006; Ham and Theron, 2009).

5.3 PRACTICES ON THE EFFECTS OF BARK STRIPPING ON BAOBAB TREES

According to Table 4.4, the average score for practices was 42.98%, indicating a poor performance. Additionally, the participating respondents in Nyanyadzi showed a high engagement in bark stripping (89.4%), whereas in Mozambique, over half of the participants were involved in bark stripping (58.8%) (Enkoro *et al*., 2019). The difference between the two areas can be attributed to the disparity in unemployment levels. Nyanyadzi area ward 8 has a higher unemployment rate, resulting in a greater percentage of people engaging in the practice. In terms of tools used, the majority of the population in Nyanyadzi used axes for bark stripping (87.1%), while in Mozambique, the results showed a significantly lower percentage of axe usage (5%). Similarly, the use of knives in Nyanyadzi was reported by 27.1% of participants, whereas a study in Southern Mozambique indicated a 5% knife usage (Enkoro *et al*., 2019). In Mozambique, machetes were the preferred tool (63.3%), unlike axes and knives.

Common practices employed to reduce and manage the effects of baobab bark stripping included avoiding stripping right around the tree (38.8%), focusing on the southern part of the tree (25.9%), harvesting small sections of the tree (17.6%), and pruning large branches (17.6%). A related study conducted in Namibia revealed a higher percentage (58.8%) of avoiding stripping right around the trees (Naah *et al*., 2017). The results indicate that people in Namibia tend to follow methods to reduce the effects more than those in the Nyanyadzi community. Regarding the focus on the southern part of the tree, in Mozambique, the percentage was 17.8%, while harvesting small sections accounted for 16.1% (Enkoro *et al*., 2019).

A significant number of people were aware of the regulations and guidelines regarding bark harvesting (92.9%). However, a smaller percentage (41%) actually followed these rules and regulations, while a higher (44%) did not adhere to them. A previous study in Southern Mozambique reported a similar awareness level (41.2%) of regulations for conserving baobab trees and compliance with them. The Nyanyadzi community followed the guidelines primarily

due to enforcement by traditional leaders. They operate under a community rule that governs them, and failure to comply with the law results in reparations paid to the chief in the form of cattle and goats.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The evaluation of knowledge, attitudes, and practices concerning the impact of bark stripping on baobab trees has emphasized the urgent need for awareness and conservation strategies. This conclusion was drawn based on the findings that revealed the heavy reliance of the Nyanyadzi community on baobab products. Participants demonstrated a level of awareness regarding bark stripping and its effects on the trees and the ecosystem. However, there were instances where individuals lacked a comprehensive understanding of the detrimental consequences of bark stripping on baobab trees, which are crucial for the ecosystem. Nevertheless, the majority of participants expressed a willingness to learn more about conservation methods and sustainable utilization of baobab resources.

This assessment has provided valuable insights into the current knowledge, attitudes, and practices, enabling the implementation of educational awareness campaigns and promoting sustainable practices. These efforts aim to preserve the baobab tree and ensure its long-term sustainability.

6.2 RECOMMENDATIONS

The study highlights the various uses of baobab bark, including medicine, rope making, and food. Bark stripping is driven by factors such as poverty and unemployment, as people resort to this activity to earn income. The funds generated from selling bark are used to pay for education fees, purchase food for the family, and cover healthcare expenses. However, the practice of bark stripping leads to conflicts between humans and monkeys, resulting in injuries during pursuit. Therefore, it is necessary to explore alternative livelihoods to replace bark stripping.

To address this issue, several interventions are recommended. These include introducing nutritional gardens, community savings initiatives (such as mukando), farmer field schools, and implementing small-scale livestock and irrigation schemes for agriculture and beekeeping. Additionally, the urgent implementation of small grain farming can provide an opportunity for income generation and improve livelihoods.

Furthermore, comprehensive educational campaigns are essential to raise awareness about the negative impacts of bark harvesting. These campaigns should involve local communities and

relevant stakeholders, emphasizing the ecological and cultural significance of baobab trees. Integrating sustainable harvesting practices and establishing community-led conservation

projects can contribute to the long-term protection of baobab trees. Effective laws and enforcement should be implemented through collaboration among government agencies, non-governmental organizations, and the local community. The Forestry Commission should also consider working closely with the community and traditional leaders to implement baobab tree planting days twice a year, providing support and guidance.

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APPENDICES

APPENDIX 1: RESEARCH QUESTIONNAIRE

My name is Takudzwa Knight Sithole, with registration number B202617B, studying at the Faculty of Agriculture and Environmental Science, Bindura University of Science Education. For my final year dissertation, I would like to do my study in Nyanyadzi, Chimanimani District, Manicaland Province, Zimbabwe. The purpose of this research is to assess the knowledge, attitudes, and practices related to the impacts of baobab bark stripping. The selection of households for the survey will be randomized, and we assure you that all the information provided will be treated with strict confidentiality. Your participation in answering these questions is highly appreciated as it will help us in planning environmental initiatives and developing more effective environmental regulations.

Please note that this survey is not an exam, but rather an opportunity for you to share your thoughts on these matters. There are no "correct" or "incorrect" responses; we simply value your opinions. If you are willing to participate in an interview based on this questionnaire, I would be immensely grateful. Please feel free to provide your responses, as all ethical principles have been followed.

INSTRUCTIONS TO PARTICIPANTS

2 Tick the answer and fill in wherever possible.

3 Never put your name on any portion of the page.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age (years): 18-25 ☐ 26-33 ☐ 34-41 ☐ 42-49 ☐ 50-57 ☐ 58+ ☐

2. Sex: Male ☐ Female ☐

3. Employment: Unemployed ☐ Employed ☐

4. How long have you been a resident of this area?
0-10 years ☐ 11 – 20 years ☐ 21 and Over years ☐

5. Highest Educational level: Primary ☐ Secondary ☐ Tertiary ☐

SECTION B: KNOWLEDGE

6. Do you know what baobab trees are? YES ☐ NO ☐

7. If yes, what are the uses of baobab bark in your community? ……

……

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8. Explain what you understand by Bark stripping.

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9. Do you know the effects of baobab tree bark stripping? YES ☐ NO ☐

10. If yes, what are the specific effects on the trees?

……

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……

11. What are the environmental problems caused by baobab tree bark stripping?

……

……

……

SECTION C: ATTITUDES

12. What level of interest do you have in learning more about sustainable bark stripping?

- ❖ Very interested ☐
- ❖ Somehow interested ☐
- ❖ Not interested ☐
- ❖ Don't know ☐

13. Do you think that baobab trees bark stripping has negative consequences for the community? YES☐ NO ☐

14. If yes, what are the consequences to the community?

……

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……

15. What are the major drivers of baobab bark stripping in your community?

……

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……

16. Do you support efforts to conserve baobab trees and manage their resources sustainably? YES☐ NO ☐

17. Who, in your opinion, ought to be in charge of resolving the problems associated with baobab tree bark stripping?

All stakeholders☐ The government ☐ The cooperative ☐ Agricultural NGOs ☐Regional organizations ☐ Everyone ☐ The future generations ☐Community groups ☐ Volunteer organizations ☐ Private sector ☐

18. Is the community making every effort to cope with the problems of baobab bark stripping? YES☐ NO ☐

19. If YES, to what extent are you aware of the community's reaction towards the problems?

- ❖ A great deal ☐
- ❖ A fair amount ☐
- ❖ Not much ☐
- ❖ Hardly anything ☐
- ❖ Don't know ☐

SECTION D: PRACTICES

20. Have you ever personally stripped bark from a baobab tree? Yes ☐ No ☐

21. If yes, how often do you engage in this practice?

……

……

22. What methods do you use to strip bark from baobab trees?

……

……

……

23. What are the common practices used to reduce the effects of baobab bark stripping?

……

……

……

24. Are you aware of any regulations or guidelines regarding baobab bark harvesting in your community? Yes ☐ No ☐

25. If yes, do you follow these regulations or guidelines? Yes ☐ No ☐

APPENDIX 2: ACADEMIC SUPERVIOUR'S PERMISSION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE
DEPARTMENT OF NATURAL RESOURCES

P. Bag 1020
BINDURA, Zimbabwe
Tel: +263 0712812712
Cell : 0772236104
Email :wmhlanga@buse.ac.zw

BINDURA UNIVERSITY OF SCIENCE EDUCATION

15th January 2024

TO WHOM IT MAY CONCERN

REQUEST FOR PERMISSION TO COLLECT DATA FOR ACADEMIC RESEARCH PROJECT IN NYANYADZI, CHIMANIMANI DISTRICT

PROJECT TITLE: ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES OF THE EFFECTS OF BAOBAB TREE BARK STRIPPING IN NYANYADZI COMMUNAL AREA, CHIMANIMANI DISTRICT

ACADEMIC SUPERVISOR: MR A. KUNDHLANDE

This letter serves to inform you that **Sithole Takudzwa Knight (B202617B)** is a Bachelor of Science Honours Degree in Natural Resources Management student at Bindura University of Science Education in the Department of Natural Resources. During his final year of study he is supposed to do a research project in his area of specialisation.

Please assist in any possible way. Data collected will be used for academic purposes only and will not be published without your prior consent.

Thank you for your assistance.

Mr W. Mhlanga
ACTING CHAIRMAN, DEPARTMENT OF NATURAL RESOURCES

APPENDIX 3: CRDC PERMISSION

CHIMANIMANI RURAL DISTRICT COUNCIL

TELEPHONE +263272052272/3
FAX 2403
Email: chimanimanirdc@gmail.com

All correspondences to be addressed to the Chief Executive Officer

Stand 267
P.O Box 65
Chimanimani

January 17, 2024

TO WHOM IT MAY CONCERN

Re: **PERMISSION TO COLLECT DATA FOR ACADEMIC RESEARCH IN CHIMANIMANI DISTRICT.**

This letter serves to inform you that Takudzwa Knight Sithole (B202617B) has been granted permission to collect academic data in Chimanimani District. The data is to be used to gather inform for his research project titled: ***Assessment of knowledge, attitudes and practices of the effects of baobab tree burk striping in Nyanyadzi communal area, Chimanimani district.***

May you assist him in any way possible

Thank you for your cooperation

16 JAN 24

pp Muchinapo B
Community Development and Social Services
CHIMANIMANI RURAL DISTRICT COUNCIL

Takudzwa Knight Sithole (B202617B)

ORIGINALITY REPORT

12%	10%	2%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	uir.unisa.ac.za Internet Source	9%
2	AIDA CUNI SANCHEZ. "THE STATUS OF BAOBAB TREE POPULATIONS IN SOUTHERN MALAWI: IMPLICATIONS FOR FURTHER EXPLOITATION", Forests, Trees and Livelihoods, 2011 Publication	1%
3	link.springer.com Internet Source	1%
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5	Achille E. Assogbadjo, Flora Josiane Chadare, Leonard Manda, Brice Sinsin. "A 20-Year Journey Through an Orphan African Baobab (Adansonia digitata L.) Towards Improved Food and Nutrition Security in Africa", Frontiers in Sustainable Food Systems, 2021 Publication	1%