



Contribution of Timber and Honey on Livelihood of  
Communities Adjacent to Village Land Forest Reserves  
in Songea and Liwale Districts, Tanzania  
- Master Thesis for the Sokoine University of Agriculture

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Angela Atilio Mlawa

May 2024



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**FINLAND**

**Sokoine University of Agriculture**



**MSc Dissertation**

**Contribution of Timber and Honey  
on Livelihood of Communities  
Adjacent to Village Land Forest  
Reserves in Songea and Liwale  
Districts, Tanzania**

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**CONTRIBUTION OF TIMBER AND HONEY ON LIVELIHOOD OF  
COMMUNITIES ADJACENT TO VILLAGE LAND FOREST  
RESERVES IN SONGEA AND LIWALE DISTRICTS**

***This dissertation is submitted to Sokoine University of  
Agriculture in fulfilment of the requirements for the Master  
Degree of Science in Environmental and Natural resource***

***By***

**Angela Atilio Mlawa**

**Supervisors**

**Prof. J. M. Abdallah  
Dr. E. E. Mwakalukwa**

**Department of Forest and Environmental Economics  
College of Forestry, Wildlife and Tourism  
Sokoine University of Agriculture, Morogoro, Tanzania**

**May 2024**

## **EXTENDED ABSTRACT**

Village Land Forest Reserves are recognized as important base for rural community development. Forest products obtained from these forests are essential for improving livelihoods of communities residing close to these forests. This study assessed timber and honey products from two village land forest reserves located in Liwale and Songea Districts to understand at what extent does these products contribute to the improvement of livelihood assets of people living adjacent to these forests and how these products contribute towards improvement of the condition of these forests. The study was guided by the assumption that harvesting of these products from these forests is guided by the presence of robust management plan which indicate the allowable quantity of wood to be harvested, where to be harvested, who should be involved and how the revenue accrued from selling of these products should be ploughed back to reinforce the management of these forests. With regards to honey production it is assumed that local communities have been trained to properly use the forests for beekeeping activities and have been supplied with important facilities to enable them properly harvest and process their honey to meet the market standards of this product. It was important to assess the contribution of forest products on livelihood assets in order to understand the interaction between the livelihood assets to bring the livelihood improvement.

Data were collected using household structured questionnaires and focused group discussion. A total of 71 timber dealers' households (38 in Songea and 33 in Liwale District) and 37 honey dealers' households (23 in Songea and 14 in Liwale District) were interviewed in this study. Inferential statistical using the binary logistic model and descriptive statistics such as frequency and percentage and also inferential statistics were used to report the results of this study.

Results show that there is gain in livelihood assets which have contributed to the livelihood improvement. It was revealed that,

physical capital indicators including better education, better health care and food security had significant influence on livelihood of timber and honey dealer as the p-value ( $p < 0.05$ ). Also, savings as an indicator of financial capital had significant influence on the livelihood of honey and timber dealers similarly, training as an indicator in human capital had significant contribution on livelihood of honey and timber dealers, membership status had significant influence on livelihood contribution  $p < 0.05$ . Factors that contributed to this trend include poor transportation facilities in the forest, lack of market and insufficient modern harvesting and processing tools. Therefore, VLFRs through timber and honey products, have contributed to livelihood improvement of the communities adjacent to forests but more support to the communities adjacent the Village Land Forest Reserves on timber and honey production should be provided so as to build their strong foundation for their livelihood improvement. Policymakers and stakeholders can use these findings to develop interventions for sustainable livelihoods and community development.

**Key words;** Livelihoods, timber, honey, adjacent communities, Village Land Forest Reserves, Tanzania

## IKISIRI KUU

Msitu wa Akiba wa Ardhi ya Kijiji unatambuliwa kama msingi muhimu wa maendeleo ya jamii vijijini. Bidhaa za misitu zinazopatikana katika misitu hii ni muhimu kwa kuboresha maisha ya jamii zinazoishi karibu na misitu hiyo. Utafiti huu ulichunguza bidhaa za mbao na asali kutoka kwenye misitu miwili ya akiba ya ardhi ya kijiji iliyoko Wilaya za Liwale na Songea ili kuelewa kwa kiasi gani bidhaa hizi zinasaidia kuboresha mali ya maisha ya watu wanaoishi karibu na misitu hiyo na jinsi bidhaa hizi zinasaidia kuboresha hali ya misitu hiyo. Utafiti huu uliongozwa na dhana kwamba uvunaji wa bidhaa hizi kutoka kwenye misitu hii unazingatiwa na mpango imara wa usimamizi unaonyesha kiasi kinachoruhusiwa cha mbao kuvunwa, mahali pa kuvunwa, nani anapaswa kuhusishwa, na jinsi mapato yanayopatikana kutokana na mauzo ya bidhaa hizi yanavyopaswa kurudishwa ili kurejesha nguvu ya usimamizi wa misitu hiyo. Kuhusu uzalishaji wa asali, inadhaniwa kwamba jamii za ndani zimefundishwa kutumia misitu kwa shughuli za ufugaji nyuki na zimepewa vifaa muhimu ili kuwezesha uvunaji na usindikaji wa asali yao kufikia viwango vya soko vya bidhaa hii. Ilikuwa muhimu kuchunguza mchango wa bidhaa za misitu kwenye mali ya maisha ili kuelewa mwingiliano kati ya mali ya maisha ili kuleta uboreshaji wa maisha.

Takwimu zilipatikana kwa kutumia maswali yaliyoandaliwa kwa kaya na majadiliano ya kikundi kilichokusudiwa. Jumla ya kaya 71 za wauzaji wa mbao (38 katika Wilaya ya Songea na 33 katika Wilaya ya Liwale) na kaya 37 za wauzaji wa asali (23 katika Wilaya ya Songea na 14 katika Wilaya ya Liwale) zilihojiwa katika utafiti huu. Takwimu za takwimu za kutumia mfano wa logistiki ya binary na takwimu za maelezo kama vile mara na asilimia na pia takwimu za kihakika zilitumiwa kutangaza matokeo ya utafiti huu.

Matokeo yanaonyesha kuwa kuna faida katika mali ya maisha ambayo imechangia kuboresha maisha. Ilibainika kuwa, viashiria vya mtaji wa kimwili ikiwa ni pamoja na elimu bora, huduma bora za afya, na usalama wa chakula vilikuwa na ushawishi mkubwa kwa

maisha ya wafanyabiashara wa mbao na asali kama thamani ya  $p$  ( $p < 0.05$ ). Vilevile, akiba kama kiashiria cha mtaji wa kifedha ilikuwa na ushawishi mkubwa kwa maisha ya wafanyabiashara wa asali na mbao vivyo hivyo, mafunzo kama kiashiria cha mtaji wa kibinadamu kilichochangia kwa kiasi kikubwa katika maisha ya wafanyabiashara wa asali na mbao, hadhi ya uanachama ilikuwa na ushawishi mkubwa katika mchango wa maisha  $p < 0.05$ . Mambo yaliyochangia mwelekeo huu ni pamoja na miundombinu mibovu ya usafirishaji katika msitu, ukosefu wa soko na vifaa vya kisasa vya uvunaji na usindikaji. Kwa hiyo, Msitu wa Akiba wa Ardhi ya Kijiji kupitia bidhaa za mbao na asali, umechangia kuboresha mali ya maisha ya jamii zinazoishi karibu na misitu lakini msaada zaidi kwa jamii zinazoishi karibu na Msitu wa Akiba wa Ardhi ya Kijiji kwenye uzalishaji wa mbao na asali unapaswa kutolewa ili kuimarisha msingi wao imara kwa uboreshaji wa maisha yao. Watunga sera na wadau wanaweza kutumia matokeo haya kuendeleza mikakati ya kuingilia kati kwa ajili ya maisha endelevu na maendeleo ya jamii.

## DECLARATION

I, **Angela A. Mlawa**, do hereby declare to the Senate of Sokoine University of Agriculture that this research is my own original work, and has not been submitted for a degree award in any other University.

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Angela Mlawa  
**(Msc.Candidate)**

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Date

The above declaration is confirmed by:

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Prof. J.M. Abdallah  
**(Supervisor)**

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Date

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Dr. E. E. Mwakalukwa  
**(Supervisor)**

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Date



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First and foremost, I would like to sincerely express my gratitude to the Almighty God for granting me the strength and good health to embark on this study. Additionally, I would like to extend my heartfelt thanks to my family for their unwavering support throughout my academic journey.

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## **DEDICATION**

With heartfelt gratitude, I dedicate this dissertation to my beloved parents, Mr. and Mrs. Atilio Mlaw. Your unwavering love, support, and sacrifices have been the foundation of my academic journey. Your encouragement, guidance, and belief in me have constantly inspired me. To my dear siblings, Betty, Dorice, and Catherine, thank you for being my unwavering pillars of strength. Your faith in me and endless encouragement has propelled me forward during challenging times. I treasure the immeasurable joy and motivation you bring to my life, and I cherish the profound bond we share.

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2. Assessment of Supportive functions for forest enterprises from village land forest reserves: the case of Songea and Liwale District, Tanzania.

## **LIST OF ACRONYMS**

CBFM	Community Based Forest Management
FORVAC	Forestry and Value Chain Development Program
LIMAS	Lindi and Mtwara Agribusiness Support project
MCDI	Mpingo Conservation Development Initiatives
MNRT	Ministry of Natural Resources in Tanzania
NFBKP	National Forestry and Beekeeping Programme
NGOs	Non-Government Organizations
PFM	Participatory Forest Management
VLFR	Village Land Forest Reserve

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

Tanzania mainland area under forests and woodlands is 48.1 million ha which is about 55% of total land area. Woodlands alone accounted for 44.7 million ha (MNRT, 2022). The woodlands and dry forests in Tanzania are mainly the miombo forests, dominated by species of the genera *Brachystegia*, *Julbernardia* and *Isoberlinia* (MNRT, 2022). Forests are recognized as an important resource base for social and economic development of Tanzania (Giliba *et al.*, 2010). Majority of the rural communities depend on forest products for their livelihoods and therefore forests contribute to poverty reduction (Augustino *et al.*, 2016).

In order to ensure equitable access to forest products, economic opportunities, and the conservation of ecosystems, participatory forest management (PFM) was introduced. PFM embodies a cooperative model of forest governance, wherein local communities, supported by governmental bodies, play a central role in decision-making regarding forest assets. PFM encompasses two primary approaches: Community-Based Forest Management (CBFM), wherein local communities possess both usage and ownership rights, and Joint Forest Management (JFM), wherein government retains ownership while local communities are granted usage rights. This study specifically delves into the dynamics of CBFM (MNRT 2012).

Community-based forest management (CBFM) in Tanzania entails a participatory approach wherein local communities are empowered to oversee and sustainably utilize forest resources within their territories. Through the establishment of Community Forest Reserves (CFRs), communities gain legal recognition and control over designated forest areas, allowing them to engage in activities

such as timber and non-timber forest product harvesting (Blomley and Iddi, 2009; Treue *et al.*, 2014; Kalonga *et al.*, 2015). CBFM initiatives emphasize capacity building, fostering partnerships between communities, government agencies, NGOs, and other stakeholders to promote equitable benefit-sharing, conflict resolution, and the conservation of biodiversity while improving livelihoods for rural populations.

Participatory forest management (PFM) seeks to empower local communities and grant them a voice in the management of forests. Its goal is to enable active involvement of local communities in decision-making and planning processes, thereby enhancing their sense of ownership and accountability towards forest resources (Dahal and Capistrano 2006; Sungusia, 2018). Active participation of local communities plays a vital role in enhancing the condition of forests, and their involvement is essential for effective management of forest resources (Nzunda *et al.*, 2017). This includes the development and implementation of forest management plans, monitoring and reporting of forest conditions and the allocation and distribution of benefits derived from forest resources (Sungusia, 2018).

The Miombo woodlands play a crucial role in sustaining the livelihoods of numerous rural and urban communities (Abdallah and Monela, 2007). These woodlands are vital source of various resources such as food, energy, shelter, medicines, as well as invaluable environmental and spiritual services (Njana *et al.*, 2013). They are also important for carbon storage and sequestration, biodiversity habitats, and timber and nontimber products (Lupala *et al.*, 2015).

Honey and timber are considered to be the valuable products from forests especially from VLFRs. Also, enterprises that venture on timber and honey supply are likely to be profitable and of greater impact on the socio-economic development in rural villages

(FORVAC, 2020). Songea and Liwale are among the Districts with CBFM in Tanzania and, various Community Based Forest Projects (CBFPs) have been implemented, for example, LIMAS and NFBKP. The district also has potential for timber and honey production.

## **1.2 Problem Statement**

The sustainable utilization and contribution of forest products to the livelihoods of communities adjacent to Village Land Forest Reserves face challenges due to limited access, inadequate value addition, and environmental degradation, thereby threatening the economic well-being and ecological balance of these communities.

The CBFPS in CBFM areas intends to is to minimize challenges and enhance the involvement of the community in management of forest resources. It aims to reinforce governance at the local level while creating measurable social, economic, and financial advantages in a sustainable manner. Consequently, the CFBP in CBFM areas is seen as a pathway to conservation; improve human well-being and social equity, while significantly reducing forest degradation and deforestation. It has been found that, income and employment would reduce deforestation, prevent the loss of biodiversity and ecosystem services Fisher and Christopher (2007).

Forest products play a vital role in supporting the livelihoods of communities residing adjacent to Village Land Forest Reserves (VLFRs). Despite the recognized significance of forest products in enhancing livelihoods, there exists a gap in understanding the specific contributions in Liwale and Songea Districts. Previous studies explored mainly on value chain of forest products such as timber, honey and mushroom and the market systems of products from VLFRs. However, the studies did not focus on livelihoods assets such as human capital, physical, natural, financial and social capital that are considered as building blocks of sustainable livelihoods (Magafu, 2020; Vyamana, 2021). This lack of information creates a gap in comprehending the significance of forest products

for local communities and hinder the formulation of effective policies and interventions to support sustainable livelihoods

### **1.3 Justification of the Study**

Findings of this study is in line with Tanzania National Forest Policy which aims to facilitate the growth of the forest sector, generate employment opportunities, promote forest industrial development and foster the development of rural industries. This research is also in accordance with Sustainable Development Goals Number 1 which prioritizes poverty reduction. Furthermore, the results from this study are useful for development projects, academics and policy makers for conducting future research in livelihoods analysis, formulating policies for replicating, or implementing new interventions.

### **1.4 Objective of the Study**

The overall objective of this study is to explore the contribution of timber and honey production to people's livelihoods adjacent Village Land Forest Reserves in Liwale and Songea Districts.

#### **1.4.1 Specific Objectives**

1. To examine supporting functions to honey and timber producers in Songea and Liwale districts.
2. To assess the contribution of honey and timber production to the livelihood of communities adjacent to livelihood VLFRs in Songea and Liwale districts.
3. To determine challenges facing timber and honey production in Songea and Liwale districts

### **1.5 Hypothesis**

$H_0$ : Forest products from Village Land Forest Reserves do not contribute to livelihoods improvement

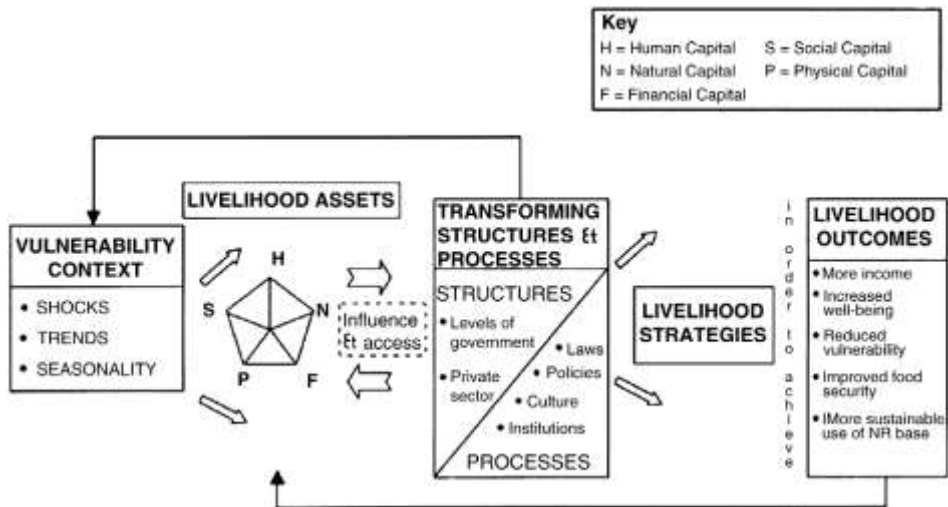
$H_1$ : Forest products from Village Land Forest Reserves contribute to livelihoods improvement

## **1.6 Theory and Methods**

This study employs the sustainable livelihood framework (Williams & Hussein, 2019) to understand the livelihoods of communities living adjacent to VLFRs in Songea and Liwale Districts. The framework (Fig 1.1) recognizes financial, physical, social, and human capital assets, which play a crucial role in shaping livelihood outcomes. By combining these assets, including income, savings, infrastructure, social networks, shared values, knowledge, and skills, communities can achieve positive changes in their livelihoods. This study focuses on the contribution of honey and timber production from VLFRs to the improvement of livelihoods in these communities.

By examining the role of honey and timber production, this study aims to demonstrate how these forest products obtained from VLFRs contribute to the enhancement of livelihoods in neighboring communities. The sustainable livelihood framework provides a comprehensive understanding of the various capital assets involved and their significance in achieving favorable livelihood outcomes. Understanding the interplay between these assets and the utilization of forest resources can inform strategies for promoting sustainable livelihoods and supporting the well-being of communities adjacent to VLFRs.





**Figure 1.1: Sustainable livelihood conceptual framework model.**

Source: DFID's sustainable livelihoods framework.

Sample size justification data from the entire population has been collected, resource constrains.

## 1.7 Dissertation Structure

This dissertation is organized into four chapters, being preceded by an extended abstract which summarizes the study by providing the objectives, material and methods, principal research findings and conclusion. Chapter one presents the general introduction covering the background information, problem statement, justification of the study, objectives and hypothesis. Chapters two and three, present results obtained from the specific objectives which are synthesized in the manuscript. Chapter four presents the general discussion and chapter five presents the general conclusion and recommendations

## CHAPTER TWO

### Manuscript One

#### **2.0 The Contribution of Village Land Forest Reserves in Livelihood Improvement: The Case of Songea and Liwale Districts, Tanzania**

Angela A. Mlaw<sup>1</sup>, Jumanne M. Abdallah<sup>1</sup> and Ezekiel E.  
Mwakalukwa<sup>2</sup>

<sup>1</sup>Department of Forest and Environmental Economics, College of  
Forestry, Wildlife and Tourism, Sokoine University of Agriculture,  
Tanzania.

<sup>2</sup>Department of Ecosystems and Conservation, College of Forestry,  
Wildlife and Tourism, Sokoine University of Agriculture, Tanzania.

Corresponding author: [angel3mlawa@gmail.com](mailto:angel3mlawa@gmail.com)

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## **Abstract**

Village land forest reserves (VLFRs) are recognized as important base for rural communities development. This study used timber and honey production activities to assess the actual contribution of three Village land forest reserves of Lupagalo VLFR from Songea District in Ruvuma Region, and Liboya and Luhangino VLFRs from Liwale District in Lindi Region on livelihood improvement rural communities living adjacent to these forests. This study assessed livelihood improvement based on financial, human, physical and social assets. Data were collected using household structured interviews and focused group discussion. A total of 71 timber dealers (38 in Songea and 33 in Liwale District) and 37 honey dealers (23 in Songea and 14 in Liwale District) were interviewed in this study. Inferential statistics and Descriptive statistics such as frequency and percentage were used to report the results of this study. Results show that there is gain in livelihood assets due to timber and honey production. In addition, findings reveal that, physical capital indicators including better education, better health care and food security had significant influence on livelihood of timber and honey dealer as the p-value ( $p < 0.05$ ). In financial capital, savings had significant influence on the livelihood of honey and timber dealers similarly to this training as an indicator in human capital had significant contribution on livelihood of honey and timber dealers. Further, basing on social capital, membership status had significant influence on livelihood contribution  $p < 0.05$ . Since this study considered only two products, other forest products such as firewood, charcoal and medicinal plants should be assessed.

**Key words:** Livelihoods, timber, honey, adjacent communities, Village Land Forest Reserves, Tanzania

## 2.1 Introduction

Community-Based Forest Management (CBFM) is one of strategies which aims to sustainably manage forest resources while improving the economic and environmental aspects as well as the livelihoods of local communities (Yahya, 2019) [1]. CBFM has led to the establishment of Village land forest reserves (VLFRs) which are also recognized as an important resource base for social and economic development and environmental conservation for many rural communities. (Dev *et al.*, 2003.,Njana *et al.*,2013 and Yego *et al.*,2021)[2,3,4]. Since forests are important sources of timber and non-timber forest products, majority of the rural communities depend on forests for their livelihoods (Kibria *et al.*, 2018;Verkerk *et al.*, 2022 and Andrew *et al.*, 2023)[5,6,7]. Through extraction of various forest products, communities adjacent to VLFRs improve their livelihoods. (Augustino *et al.*, 2016; Babulo *et al.*, 2008; Mallya and Masao, 2020)[8,9,10].

Despite having valuable forest resources, majority of communities living adjacent to forests have remained in low living standard. Many studies discussed the issues of livelihood improvement for example (Fikir *et al.*, 2016)[11], provided empirical evidence on the contribution of dry forest to the annual income of rural households in Ethiopia. (Langat *et al.*,2016)[12], assessed the role of forest resources in local livelihoods in Kenya, (Mavindi 2021;Rwahame 2008)[13,14] addressed the contribution of forest products on livelihoods in Ruvuma and Rukwa, Tanzania, respectively. However, there have been little focus on assessing contribution of VLFRs on livelihoods especially in Songea and Liwale districts. Thus leaving an information gap in understanding the contribution of the contribution of VLFRs on livelihoods of communities adjacent to forests. The information is essential for policy makers to design and implement effective policy management policies and programs that take into account the needs and rights of local communities. Therefore, this study assessed contribution of VLFRs on livelihood improvement by focusing on livelihood assets. It draws results from

two forest products (timber and honey) from the three VLFRS located in the two study sites of Songea District in Ruvuma Region and Liwale district in Lindi Region, in Tanzania. The two sites were selected based on the historical data of implementing these two activities (timber and honey) in their VLFRs (FORVAC,2020) [15]. Specifically, the study aimed to: (i) examine the gain of livelihood assets due to timber and honey production and (ii) assess the influence of gained livelihood assets on livelihood improvement.

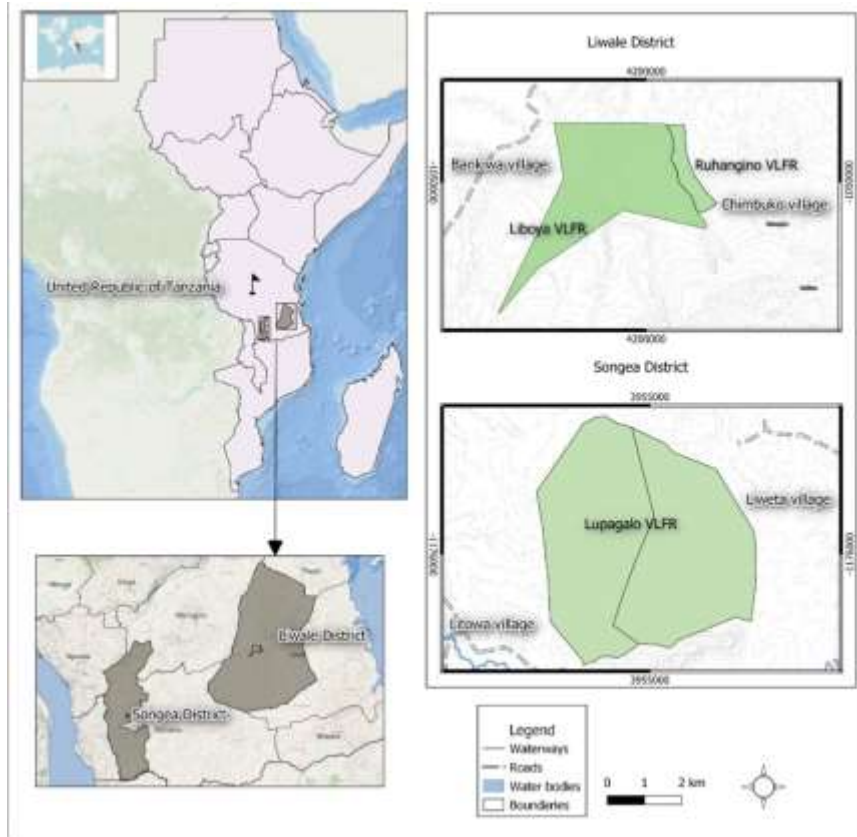
## **2.2 Methodology**

### **2.2.1 Description of the study area**

The study was conducted in Liweta and Litowa villages located in Parango Ward, Songea District in Ruvuma Region who owned the Lupagalo VLFR which was established in 2010 and covers an area of about 1,289 ha with a boundary length of 15km (Figure 2.1). The Litowa village has a total area of 17,191 ha. There are 313 households with a total population of 1,418 people composed of multi-ethnic groups mainly ngoni as dominant tribe, yao, ndendeule, sukuma and mbulu. The main economic activities are agriculture and livestock keeping. Liweta village on other hand, has a total area of 13,475 ha. The numbers of households are 383 with a total population of 1,345 people. The village has multi-ethnic groups mainly the ngoni as dominant tribe,yao, bena, nyasa, kinga, ndendeule, pangwa and masai. The main economic activities are agriculture and livestock keeping.

The study was also conducted in Liwale District, Lindi Region in the two villages of Chimbuko and Barikiwa villages (Figure 2.1). The forest in Chimbuko village is called Ruhangino VLFR which was established in 2007 and it covers an area of about 18,915 ha.The village has a total area of 67,253.1405ha. The village has bounded with Selous game reserve. The dominant tribe found is known as ngindo. The forest in Barikiwa village is called Liboya VLFR which was established in 2007 and covers an area of about 19,268ha.

The three Village land forest Reserves are capable of supporting beekeeping activities and have valuable timber tree species such as *Pterocarpus angolensis*, *Brachystegia floribunda*, *Brachystegia manga* and *Percophids angolensis*.



**Figure 2.1: A map of villages around Village Land Forest Reserves.**

### 2.2.2 Sampling and data collection

Both purposive and random samplings were employed in this study. Purposive sampling was applied on selecting villages that have VLFRs of which honey and timber extraction being among the activities from the forest while random sampling was applied to select respondents for the interviews using questionnaire and focus

group discussion .Sample size of the study was determined according to (Kothari,2004) [16]. A total of 108 people was used in data collection of which 37(23 in Songea and 14 in Liwale District) were honey producers and 71(38 in Songea and 33 in Liwale District) were timber dealers. Data were collected basing on livelihood assets indicators. All assets had respective indicators selected based on literature reviewed. Where by financial capital had household income, savings and saving location. Human capital had source of knowledge, training, basis of training and who provided training. Physical capital had improved education facilities, improved healthcare facilities and improved health centers. Social capital had organization membership status as indicators.

### **2.2.3 Data analysis**

Descriptive statistics were applied for the first objective which assessed the gain in livelihood capitals indicators. Data from questionnaires were entered into Excel software then examined and coded before importing into SPSS (version 23). Then outputs such as frequencies and percentages were obtained and discussed showing the extent to which livelihood capitals has been gained due to honey and timber production from VLFRs. Results are presented in term of tables, figures and graphs.

Also, inferential statistics was applied for the second objective, where by in assessing the influence of gained livelihood assets on livelihood contribution where the binary logistics regression model was used to examine the factors (livelihood assets) that contribute to the livelihood of honey and timber dealers. The binary logistic regression was used following the nature of the dependent variable that had a binary nature(dummy variables, (1=Yes ,0=No) which was the contribution of timber and honey production on livelihood. The independents variables were the indicators of human capital, social capital, financial capital and physical capital.

## **2.3 Results**

### **2.3.1 Socio economic characteristics of respondents**

The socio economic characteristics of the respondents from both sites are as presented in Table 2.1. Results show that majority of the respondents (40%) their age group ranged from 26-35 years old. About 70 % of most of families across villages had 2-5 members of household 30% with 1-2 members. Also, results showed that About 50% of respondents from Barikiwa and Chimbuko villages had an average annual income within wealth group of 500,000 - 1,000,000 while those from Litowa and Liweta had about 60% average annual income falling between 100,000 - 500,000 wealth group. Timber dealers were many compared to honey dealers. Also, majority of respondents (>75%) had attained primary education level while non was found to have tertiary education from higher learning institution.



**Table 2.1: Socio-economic characteristics of respondents in Liwale and Songea Districts (n=108) Source: field data 2022.**

Socio-economic variables		LIWALE (n=47)				SONGEA (n=61)			
		BARIKIWA (= 20)		CHIMBUKO (n=27)		LITOWA (n=32)		LIWETA (n=29)	
		Freq	%	Freq	%	Freq	%	Freq	%
<b>Age group</b>	<b>18-25</b>	0	0.0	1	3.7	4	12.5	3	10.3
	26-35	11	55.0	11	40.7	13	40.6	9	31.0
	36-45	9	45.0	8	29.6	7	21.9	9	31.0
	46-60	0	0.0	6	22.2	5	15.6	8	27.6
	60 and above	0	0.0	1	3.7	3	9.4	0	0.0
<b>Sex</b>	male	11	55.0	21	77.8	26	81.3	20	69.0
	female	9	45.0	6	22.2	6	18.8	9	31.0
<b>Education level</b>	Primary education	15	75.0	23	85.2	31	96.9	27	93.1
	Secondary education	5	25.0	4	14.8	1	3.1	2	6.9
	Tertiary Education	0	0.0	0	0.0	0	0.0	0	0.0
<b>Occupation</b>	Honey	7	35.0	7	25.9	11	34.4	12	41.4
	Timber	13	65.0	20	74.1	21	65.6	17	58.6
<b>Household Size</b>	1-2 people	7	35.0	5	18.5	3	9.4	2	6.9
	2-5 people	13	65.0	20	74.1	25	78.1	25	86.2
	Above 5 people	0	0.0	2	7.4	4	12.5	2	6.9
<b>Wealth Groups (TZS)</b>	Below 100,000	0	0.0	0	0.0	10	31.3	1	3.4
	100 000 – 500 000	1	5.0	7	25.9	20	62.5	18	62.1
	500 000 – 1 000 000	11	55.0	14	51.9	2	6.3	9	31.0
	above 1,000,000	8	40.0	6	22.2	0	0.0	1	3.4

### 2.3.2 Gain of livelihood assets due to timber and honey production

The gain in all livelihood assets was assessed based on indicators for every assets. All livelihood assets had indicators that were used as a basis for assessment. The gain in livelihood assets is shown in the following sections

### **2.3.3 Human capital**

The gain in human capital due to honey and timber production is presented as in Table 2.2. Results show that, timber and honey dealers in Liwale district attained the largest human capital livelihood contribution compared to those in Songea. Further, most of the knowledge obtained by timbers farmers in Liwale district is obtained through community interaction as 100% of respondents obtained knowledge from relatives, followed by 85.75% who got it from their neighbors and about 81.8% from NGOs (non-Government organizations), similarly in Songea whereby about 10% got knowledge from neighbors and only 4% from NGOs while Honey dealers had no information source linked with them.

For the case of training, about 93.1% of timbers dealers in Liwale districts were trained and only about 6% of timber dealers were trained in Songea district. Similarly, about 33.3% of Honey dealers had been trained in Liwale while non-Honey dealer have been trained in Songea district. Further, results show that 84.8% of timber dealers and 28.6% of honey dealers in Liwale district had received both technical and business training while only 5% of timber dealers and non in Honey dealers had received both kind training in Songea district. For the case of trainers, various programs have initiated skills.

**Table 2.2: Human capital gained due to timber and honey dealers by District (n=108). Source; field data 2022**

Human capital indicators	Response	Liwale (n=47)				Songea(n=61)			
		N		Proportion		N		Proportion	
		Honey	Timber	Honey	Timber	Honey	Timber	Honey	Timber
Source of Knowledge	NGO	11	22	36.4%	81.8%	18	23	0%	4%
	Neighbors	3	7	0.0%	85.7%	2	10	0%	10%
	Relatives	0	4	0.0%	100.0%	3	5	0%	0%
Training	yes	9	29	33.3%	93.1%	18	32	0%	6%
	no	5	4	20.0%	25.0%	5	6	0%	0%
Training type	Technical training	0	0	0.0%	0.0%	0	0	0%	0%
	Business training	0	0	0.0%	0.0%	0	0	0%	0%
	Both	14	33	28.6%	84.8%	23	38	0%	5%
Trainer	FORVAC	9	29	11.1%	86.2%	23	38	0%	5%
	FORVAC& Govt	2	1	50.0%	0.0%	0	0	0%	0%
	FORVAC& TAFAS	2	1	50.0%	100.0%	0	0	0%	0%
	MJUMITA	1	1	100.0%	100.0%	0	0	0%	0%
	TASAF	0	1	0.0%	100.0%	0	0	0%	0%

### **2.3.4 Financial capital**

The gain in financial capital due to timber and honey production in study areas are as presented in Table 2.3. Results show that timber dealers in Liwale district had attained the highest contribution to household income similarly to Honey dealers with about 33.3%, on the other hand Timber dealers in Songea had attained 17% achievement in contribution to household income following their financial capital on livelihood support. Furthermore, results show that, about 93.8% of timber dealers similarly to 66.7% of Honey dealers do not practice saving money in Liwale district which is the same about 25% of timber dealers in Songea who do not save money.

Basing on saving locations, most of timber and honey dealers save money on VICOBA (Village community Bank) and some among timber and about 66.7% of honey dealers use tradition Boxes as their saving method also this is about 40% among timber dealers in Songea district, the rest of timber dealers about 87.5% and 50% of Honey dealers prefer saving money on mobile money.

**Table 2.3: Financial capital gained due to timber and honey production by districts(n=108)**

		Liwale (n=47)				Songea(n=61)			
		N		Freq		N		Freq	
Financial capital indicators	Response	Honey	Timber	Honey	Timber	Honey	Timber	Honey	Timber
<b>Contributes (HH income)</b>	<b>no</b>	2	19	0.0%	73.7%	14	26	0%	0%
	<b>yes</b>	12	14	33.3%	100.0%	9	12	0%	17%
<b>Saving Money</b>	<b>yes</b>	8	17	0.0%	76.5%	17	30	0%	0%
	<b>no</b>	6	16	66.7%	93.8%	6	8	0%	25%
<b>Saving Location</b>	<b>no saving</b>	8	17	0.0%	76.5%	17	30	0%	0%
	<b>VICOBA</b>	1	2	100.0%	100.0%	0	0	0%	0%
	<b>Traditional box</b>	3	6	66.7%	100.0%	1	5	0%	40%
	<b>Mobile money</b>	2	8	50.0%	87.5%	5	3	0%	0%

### 2.3.5 Social capital

The gain in social capital due to honey and timber production was assessed by the group membership status of dealers as presented in Table 3.4. Results show that timber dealers in Liwale district have been benefitting from the NGOs as about 87.5% and 12.5% of Honey dealers justify that. On the other hand in Songea district about many timber dealers rely on Government support while about 39% of honey dealers negated the fact of Government support.

**Table 2.4: Social capital gained due to timber and honey production (n=108)**

Social capital indicators		LIWALE				SONGEA				
		Honey		Timber		Honey		Timber		
		n	Perc	n	Perc	Count	Perc	Count	Perc	
Organization membership	Government	no	0	0.0	0	0.0	23	39.0	36	61.0
		yes	0	0.0	0	0.0	0	0.0	2	100.0
	NGO	no	10	66.7	5	33.3	0	0.0	0	0.0
		yes	4	12.5	28	87.5	0	0.0	0	0.0

### 2.3.6 Physical capital

In this study, physical capital was assessed by using indicators including improved access to better education, better health care and food security due to timber and honey production. It was measured using Likert scale of 5 units on each indicator.

The gain in physical capital due to honey and timber production is presented as in Table 2.5. Results shows that, Timber production has contributed to better education the contribution of better education on timber and honey dealer's livelihood is highly of much contribution among timber dealers especially those from Liwale covering about 87.9% contrary to those from Songea with least contribution of about 31.6%, similarly to this for the case of honey dealers, the researcher found that there is low contribution on livelihood among honey dealers in Liwale of about 14.3% and null contribution 0% among Honey dealers in Songea. Further results

show that on the side of food security, this is of much contribution among Honey dealers in both district with the highest contribution in Liwale of about 64.2% followed by those from Songea with about 56.5%, on parallel to this, low achievement of food security in the contribution to livelihood can be seen among Timber dealers with about 39.4% in Liwale and 2.6% in Songea.

For the case of better health care provision, It was found that, timber dealers and honey dealers in Liwale district had a wide highest of better health care achievement on contributing to livelihood with about 54.5% and 28.6% respectively, while Songea on the other hand had lowest contribution of about 21.7% and 23.7% making the majority disagree the contribution of better health care among Honey and timber dealers respectively.

**Table 2.5: Physical capital gained due to timber and honey production**

Indicators	Response	LIWALE(n=47)				SONGEA(n=61)			
		Honey(n=14)		Timber n=33)		Honey(n=23)		Timber(n=38)	
		n	%	n	%	n	%	n	%
<b>Improved education facilities</b>	<b>strongly disagree</b>	8	57.1	1	3.0	10	43.5	17	44.7
	<b>disagree</b>	2	14.3	0	0.0	10	43.5	4	10.5
	<b>neutral</b>	2	14.3	3	9.1	3	13.0	5	13.2
	<b>agree</b>	0	0.0	12	36.4	0	0.0	12	31.6
	<b>strongly agree</b>	2	14.3	17	51.5	0	0.0	0	0.0
<b>Improved food security</b>	<b>strongly disagree</b>	0	0.0	0	0.0	0	0.0	0	0.0
	<b>disagree</b>	1	7.1	1	3.0	2	8.7	25	65.8
	<b>neutral</b>	4	28.6	19	57.6	8	34.8	12	31.6
	<b>agree</b>	8	57.1	13	39.4	12	52.2	1	2.6
	<b>strongly agree</b>	1	7.1	0	0.0	1	4.3	0	0.0
<b>Improved healthcare</b>	<b>strongly disagree</b>	5	35.7	1	3.0	2	8.7	8	21.1
	<b>disagree</b>	3	21.4	5	15.2	9	39.1	17	44.7
	<b>neutral</b>	2	14.3	9	27.3	7	30.4	4	10.5
	<b>agree</b>	4	28.6	18	54.5	5	21.7	9	23.7
	<b>strongly agree</b>	0	0.0	0	0.0	0	0.0	0	0.0



## **2.4 Influence of livelihood assets on livelihood of timber and honey dealers**

In assessing the livelihood of timber and honey dealers in Songea and Liwale Districts, the binary logistics regression model was used to examine the factors (livelihood assets) that contribute to the livelihood of honey and timber dealers. The binary logistic regression was used following the nature of the dependent variable that had a binary nature (dummy variables, (1=Yes, 0=No) which was the contribution of timber and honey production on livelihood. The independent variables were the indicators of human capital, social capital, financial capital and physical capital. Natural capital which only included forest patrolling was omitted in the model to reduce multicollinearity since it was practiced by all members.

The influence of physical capital on livelihood of communities around village land forest reserves is presented as in Table 2.6. Results show that, there is a significant increase in livelihood of timber and honey dealers following that the p-value of livelihood assets to be significant ( $p < 0.05$ ) among dealers who had Better education with an odds ratio of 6.5 times increase in livelihood compare to those who had not attain better education. Further, results shows that Better healthcare had a likeliness of increasing livelihood by 5.3 times higher than those who had not attain better health care which is statistically supported as the p-value (0.025) is less than 0.05. Similarly, results indicated the moderately significance of food security on livelihood by 2.7 times those who had no food security. Generally this implies that, there is the significant contribution of physical capital on the livelihood of timber and honey dealers as all the livelihood assets appeared to be significant.

The influence financial of financial capital on livelihood of communities around village land forest reserves is presented in table 7. Results show that there is moderate significant increase in livelihood of timber and honey dealers following that the p-value of livelihood assets to be significant at ( $p < 0.1$ ) among dealers who had

saving place, participate on saving and household income contribution. Results show that, only dealers who practiced saving had a significant contribution on the livelihood by 3046 times those who do not practice saving, this is statistically supported as the p-value is (0.064) is less than 0.1 level of significance. Other financial capital forms like saving places and household contribution, had shown no significant influence on the contribution of timber and honey livelihood.

The influence of human capital on livelihood of communities around village land forest reserve is presented as shown in table 7. Results show that, there is a highly significant influence of training on the contribution of timber and honey livelihood as the p-value (0.006) is less than 0.05 level of significance. On the other hand results show that , there is no significant influence of the source of knowledge in contributing to timber and honey livelihood as the p-value(0.633) is greater than 0.05 level of significance.

This implies that in human capital contribution on the livelihood of timber and honey dealers, only training play a vital role in influencing the livelihood of dealers.

The influence of social capital on livelihood of communities practicing timber and honey production around village land forest reserves are as presented in table 7. Results shows that, there is a moderate significant influence of being a member of the social group towards the contribution of livelihood among timber and honey dealers. This is statistically proved as the p-value (0.011) is less than 0.05 level of significance and the odds ratio of 17 times increase in likeliness among those who participated as members compare to those who did not participate. This implies that social capital had a significant influence on the livelihood of timber and honey dealers.

**Table 2.6: Logistic regression model assessing the influence of gained livelihood assets on livelihood of timber and honey dealers**

Livelihood assets	Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
<b>Physical</b>	Better education	1.872	0.502	13.889	1	0.000***	6.504	2.430	17.412
	Food security	1.015	0.583	3.033	1	0.082*	2.759	0.880	8.649
	Better healthcare	1.671	0.746	5.014	1	0.025**	5.319	1.232	22.972
<b>Financial</b>	Saving place	-2.357	1.513	2.428	1	0.119	0.095	0.005	1.836
	Saving	8.022	4.328	3.435	1	0.064*	3046.023	0.630	14718241.051
	HH Contribution	2.094	1.549	1.827	1	0.177	8.118	0.390	169.147
<b>Human</b>	Training	-6.407	2.310	7.694	1	0.006***	0.002	0.000	0.153
	Knowledge source	-0.402	0.841	0.228	1	0.633	0.669	0.129	3.479
<b>Social</b>	Membership	2.874	1.125	6.525	1	0.011**	17.706	1.952	160.608
	Constant	1.139	2.699	0.178	1	0.673	3.124		

p<0.01 \*\*\* , p<0.05 \*\* , p<0.1 \* and value without asterisk stand for non-significant.

Following the above results, it is statistically found that all assets had a significant partial and total contribution on timber and honey dealer's livelihood.

## **2.6 Discussion**

The findings from this study suggest that there is a gain in physical capital livelihood basing on the indicators used. Also the gain of physical capital had influenced the livelihood improvement contribution. There was significant increase in livelihood of the people due to the forest products under the study. The improved education facilities, health centers and food security contributed by forest products has led to improved livelihoods of the people. This signifies that there is positive relation between physical assets and livelihood improvement. These findings conforms with the findings of (Jeil *et al.*, 2020) [17]who reported that improved access on physical capital has positive impacts on livelihood improvement.

Further, results reveal that there were differences on the gain of the physical capital between the districts and the products under the study. This may be attributed to differences in capabilities and the experiences factors that people have on their forest product activities and the differences in wealth levels (Table 2.1). Since majority of respondents in Liwale district had long longer history of engaging in forest products than majority in Songea District (FORVAC, 2020)[15].

Findings from this study reveals that, the gain of financial capital differed between the two products of this study. Also there is insignificant contribution on livelihoods improvements due to the forest products. This may be attributed by the fact that the income generated from the activities does not benefit individually in terms of household income but rather it collectively benefit. Although not significant, study findings are in line with findings by (Musingizi *et al.*, 2018)[18] who reported that there is minimal to no significant impacts of beekeeping activities on household income and also

Hansen and Lund (2011)[19] documented that rural households do not benefit directly (in cash) from the share of timber revenues. This reveals that majority of rural people rely on agricultural incomes other than income from forest products (Veldeld *et al.*, 2012)[20]. However, this study findings are contrary to the study in Gambia reported that forest products had significant contribution on household income (Tomaselli *et al.*, 2014)[21]. Further (Ntalitwa *et al.*, 2017)[22] reported beekeeping activities had significant contribution on household income which is contrary to this study findings.

This study found that through forest products human capital as a livelihood asset was gained through trainings which were mostly offered by development programs. Further, there was significant contribution of human capital on communities adjacent to VLFRs livelihoods. The trainings was based on both technical where the dealers were trained on how to produce quality timber and honey, People were being educated on the importance of using modern bee hives, the marketing and branding of their products. These improvements had led to improved livelihoods. Results are similar to the findings of previous empirical studies (Kibria *et al.*, 2018)[5] and (Jannat *et al.*, 2018)[23] who reported that knowledge is an important factor in livelihood improvement.

In social capital, This study found that the dealers of forest products have interaction groups which help themselves to work together. The membership category was significant in influencing livelihood contribution. Generally, results revealed that the majority of community groups in study villages are being supported by non-government organization which are normally time oriented, not permanent. Additionally, (Blomley *et al.*, 2019)[24] reported that “community-based forest management currently receives limited government investment and incentives” Concurrently, (MNRT, 2022)[25] reported that non-government organizations and development programs has remained to be a driving force in enhancing and supporting PFM in mainland Tanzania. Also, study findings are contrary to the findings of study conducted in Malaysia

which reported that the government forest sector had highest intervention on developing and enhancing forest products for the livelihoods of the communities (Ibrahim *et al.*, 2017).[26]

## **2.7 Conclusions**

The main objective of this study was to assess the contribution of village land forest reserves on livelihood improvement of the households dealing with forest products (timber and honey) living adjacent to VLFRs. Specifically, it aimed at assessing the gain of livelihood assets due to the forest products and how gained livelihood assets contributes to livelihood improvement. The findings revealed that both timber and honey production contribute to the livelihood of the producers and to the community as well. This implies that, forest products can strongly improve the livelihood of the forest dependent communities. However, in terms of quantification the two products from the forests (timber and honey) contribute the least in terms of household livelihood compared to other livelihood activities like crop cultivation and livestock keeping which are the main livelihood activities in community studied. We assessed the influence of livelihood assets on livelihood contribution based on the selected indicators for each asset. The indicators had different influences on livelihoods contribution. Thus, suggesting that development efforts which aim to improve rural livelihoods through forest products need to consider all the sustainable livelihood assets and the contribution of forest products in each of the livelihood strategies. This can led to more effective outcome of development efforts.

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## **CHAPTER THREE**

### **Manuscript Two**

#### **3.0 Supportive Functions for Forest Enterprises that Dependent on Raw Materials from Village Land Forest Reserves: A Case of Songea and Liwale Districts, Tanzania**

Angela A. Mlawa\*, Jumanne M. Abdallah and Ezekiel E.  
Mwakalukwa

College of Forestry, Wildlife and Tourism, Sokoine University of  
Agriculture  
P.O. Box 3009, Chuo Kikuu, Morogoro, Tanzania

Corresponding Author: [angel3mlawa@gmail.com](mailto:angel3mlawa@gmail.com)

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### **Abstract**

Supportive functions are crucial for the viability of any business venture. However, the assessment of supportive functions for Small and Medium Forest Enterprises (SMFEs) in communities neighboring Village Land Forest Reserves (VLFRs) has been insufficiently explored. Previous studies have primarily focused on the livelihood contributions of these enterprises rather than addressing the specific needs of small forest-based businesses. To bridge this gap, the present study assessed supportive functions for forest enterprises in the Songea and Liwale Districts. Data for the study were gathered through structured interviews with households and focused group discussions. A total of 71 households involved in timber dealing (38 in Songea and 33 in Liwale District) and 37 households engaged in honey trading (23 in Songea and 14 in Liwale District) were interviewed. Descriptive statistics were employed to analyze and report the study findings. The assessment focused on the infrastructure condition, accessibility of financial support, and information flow as supportive functions. The results of the study indicate that the infrastructure condition was reported as unsupportive for timber and honey activities by 82% of respondents in Songea and 78.7% in Liwale. Access to financial support was found to be low in Songea and moderate in Liwale District. However, training and capacity building services were more readily available for both timber and honey dealers. The primary challenges identified were the lack of market opportunities (27.6%) followed by a weak transportation network connecting VLFRs to the markets (27.1%). Based on the findings, the study recommends that in order to promote the growth and prosperity of small forest enterprises, improvements are needed in both infrastructure conditions and financial assistance. By addressing those challenges, the small enterprises can enhance their chances of success and reap greater benefits.

**Key words:** Small Enterprises, Timber, Honey, Supporting functions, Village land forest reserves, Honey, Timber

### 3.1 Introduction

Forest communities residing near Village Land Forest Reserves (VLFRs) have traditionally played a significant role in forest management. In recent times, they have acquired legal rights to access the forest resources, as acknowledged by the Ministry of Natural Resources and Tourism (MNRT, 2022). They have acquired legal rights to access the forest resources, as acknowledged by the Ministry of Natural Resources and Tourism. These FEs hold great potential in alleviating poverty and promoting sustainable forest management by facilitating resource conservation (Badini *et al.*, 2018). However, for FEs to flourish as financially viable businesses, they require various supporting functions and an enabling environment comprising appropriate laws and policies (Macqueen, 2008).

On the other hand, timber production from VLFRs and demand for hardwood sawn timber is rapidly growing. The demand is because of expansion of towns booming construction and furniture (Mhando *et al.*, 2022). Also, in Tanzania honey production is increasing due to the increasing awareness level of the customers (Nega and Eshete, 2018). It has been reported that enterprises that venture on timber supply are likely to be more profitable and bring greater social economic development (Molnar *et al.*, 2011).

FEs encounter several challenges that hinder their operations and limit their progress, particularly in developing economies. Many studies have portrayed FEs, focused more on the contribution to livelihoods (e.g Giliba *et al.*, 2010; Zenteno *et al.*, 2012; Mallya *et al.*, 2020 and Khadika *et al.*, 2021) and a study by Arvola (2019) focused on assessment of timber market from plantations in Mufindi district, Tanzania. However, there is inadequate information on supportive functions of FEs which depend on VLFRS especially in Songea and Liwale Districts. Assessment of supportive functions is crucial for ensuring the long-term sustainability, managing risk,

gaining market access and informing policy decisions of forest activities.

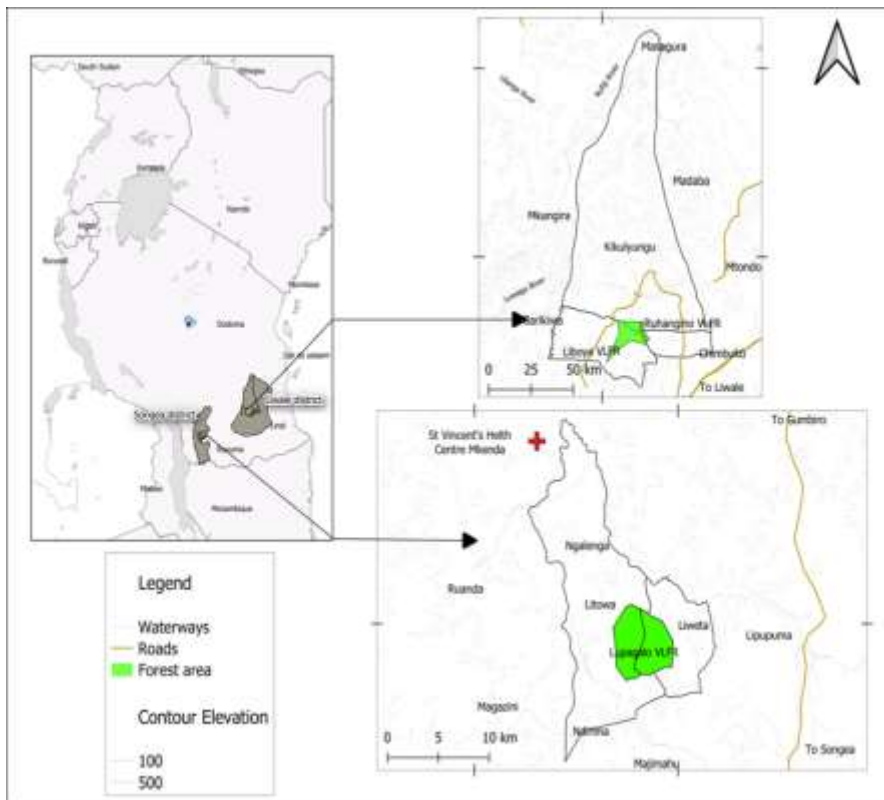
Therefore, this study assessed timber and honey enterprises that depend on VLFRs for the raw materials and assessed supporting functions of the enterprises and their associated challenges. Specifically, the study aims to (i) assess to supportive function for timber and honey activities operating in the Songea and Liwale districts (ii) to determine challenges facing timber and honey production activities in Songea and Liwale districts.

## **3.2 Research Method**

### **3.2.1 Study area description**

The study was conducted in Chimbuko and Barikiwa villages found in Songea district and Liweta and Litowa villages from Liwale District. Each village manages their forest and acquires various products from the forests. The four Village Land Forest Reserves Lupagalo in Songea and Luhangino and Liboya in Liwale District, are capable of supporting beekeeping activities and have valuable timber tree species such as as *Pterocarpus Angolensis*, *Brachystegia floribunda*, *Brachystegia manga* and *Pericopsis angolensis*.

Crop cultivation is the main livelihood activities of residents who also rely on the surrounding forests for honey, timber, firewood, and grass for thatching followed by animal rearing for the livelihood improvement.



**Figure 3.1: The map of study villages around village land forest reserves.**

### 3.2.2 Sampling and data collection

Purposive sampling and random sampling were applied in this study basing on honey and timber dealers. A total of 4 village chairmen (2 in Liwale and 2 in Songea), 37 honey dealers (23 in Songea and 14 in Liwale District) and 71 timber dealers (38 in Songea and 33 in Liwale District) was used as sample for this study.

Data were collected to get the information on the supporting functions (financial support in terms of loan accessibility, information flow and infrastructure condition whether it support the activities of timber and honey production) and also the challenges that timber and honey dealers face. Interviews by using questionnaires as a

tool were used to collect data and also secondary sources such as from forest management plans of respective VLFRs.

### **3.2.3 Data analysis**

Descriptive statistics were used to analyze the assessed supportive functions, namely infrastructure condition, financial support, and information flow. The purpose was to understand the extent to which these factors supported timber and honey enterprises. The availability of financial support, the flow of information, and the challenges faced by timber and honey dealers were examined using frequency distributions, figures, and tables.

Descriptive statistics provide a summary of the data and help to describe the characteristics and patterns within the variables of interest. In this case, the analysis aimed to provide insights into how infrastructures, financial support, and information flow contribute to the functioning of timber and honey enterprises.

## **3.3 Results**

### **3.3.1 Socio economic characteristics of respondents**

Table 3.1 presents the socio-economic characteristics of the participants from both locations. The findings indicate that a significant proportion (40%) of the respondents fell within the age range of 26-35 years. The majority of the participants (81.3%) were males. Additionally, most of the respondents (96.9%) had completed primary education, and none of them had pursued tertiary education at a higher learning institution.

**Table 3.1: Socio-economic characteristics of respondents in Liwale and Songea Districts (n=108)**

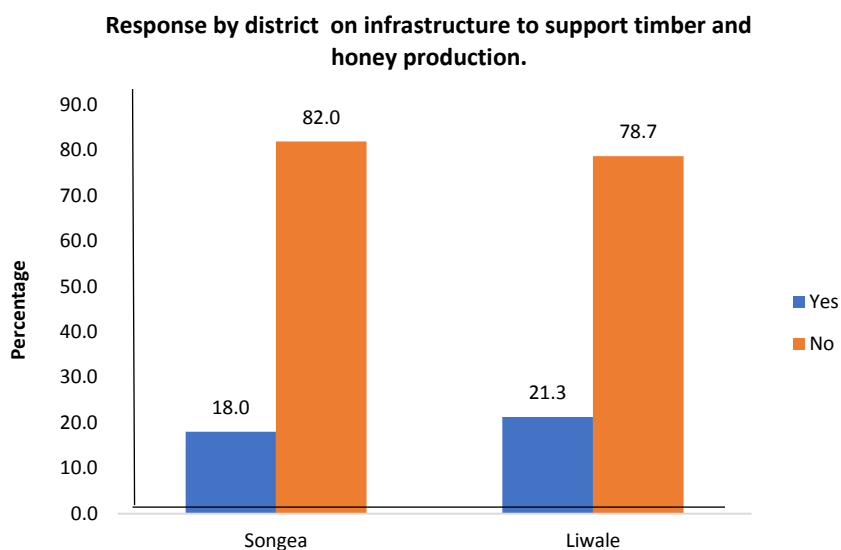
Socio-economic variables		Liwale (n=47)				Songea (n=61)			
		Barikiwa (= 20)		Chimbuko (n=27)		Litowa (n=32)		Liweta (n=29)	
		Freq	%	Freq	%	Freq	%	Freq	%
<b>Age group</b>	<b>18-25</b>	0	0.0	1	3.7	4	12.5	3	10.3
	26-35	11	55.0	11	40.7	13	40.6	9	31.0
	36-45	9	45.0	8	29.6	7	21.9	9	31.0
	46-60	0	0.0	6	22.2	5	15.6	8	27.6
	60 and above	0	0.0	1	3.7	3	9.4	0	0.0
<b>Sex</b>	Male	11	55.0	21	77.8	26	81.3	20	69.0
	Female	9	45.0	6	22.2	6	18.8	9	31.0
<b>Education level</b>	Primary	15	75.0	23	85.2	31	96.9	27	93.1
	Secondary	5	25.0	4	14.8	1	3.1	2	6.9

### **3.4 Assessment of supporting functions for timber and honey enterprises**

#### **3.4.1 Infrastructure condition to support the enterprises**

Majority of respondents in Songea (82%) and Liwale (78.7%) as presented in Figure 3.4, said the available infrastructure in the study area is do not favour their activities. The remaining 18% in Songea and 21.3% in Liwale, responded that the infrastructure condition is not a problem in dealing with their activities. Roads network is a challenge for enterprises for transportation of furniture along the value chain, especially during the rainy season. This led to raw materials shortage for furniture manufacturing. Break down of power supply (electricity) in towns and cities interrupts operations during timber furnishing and manufacturing. Some villages are not connected to the electric grid, challenging processing and other operations.





**Figure 3.2: Response on whether the infrastructure available supports forest products activities**

Source: Field data (2022)

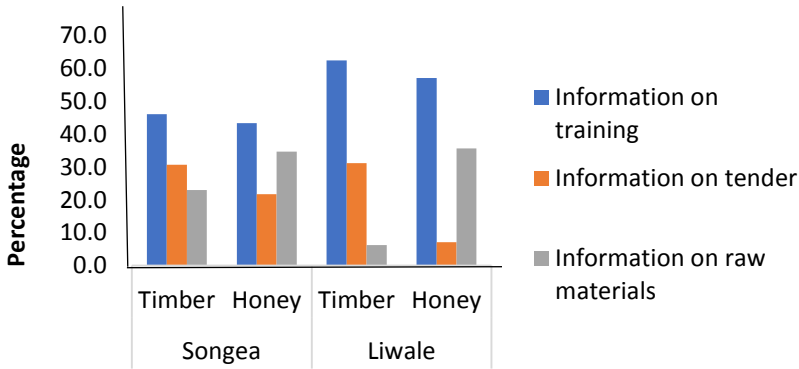
### 3.4.2 Information flow

Results in Figure 3.3 shows that the information given to both timber and honey dealers was about training, tender and raw materials. Where by information on training had 46.2% for timber and 43.5% for honey in Songea and 62.5% for timber dealers and 57.1% for honey dealers. The training received is about sustainable harvesting of forest products and how to use modern tools for both timber and honey production.

Information on tender issues was received by 30.8% and 31.3% for timber dealers in Songea and Liwale respectively. While for honey dealers it was 21.7% and 7.1% in Songea and Liwale respectively.

Information on raw materials for honey dealers in Liwale district was 6.3% for timber dealers and 35.7% for honey dealers. In Songea

district information on raw materials was 23.1% for timber and 34.8% for honey.

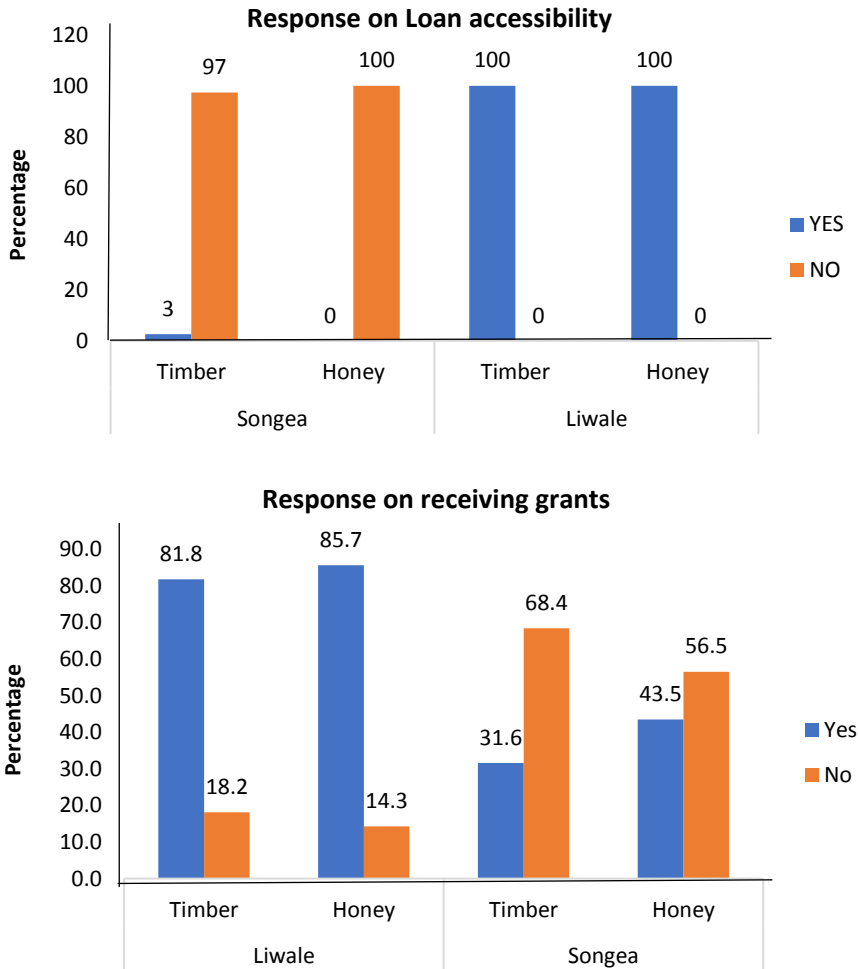


**Figure 3.3: Kind of information obtained for timber and honey dealers**

Source: field data (2022)

### 3.4.3 Financial access

Results in Figure 3.4 show that majority (100%) of responses in Songea for both timber and honey have no access to loans and also grants while majority of respondents in Liwale had access to loans and grants to support their enterprises. The grants provided were the material things that help to make the activities much easier such as the modern machines for harvesting and processing forest products.



**Figure 3.4: Response on financial services accessibility**

#### **3.4.4 Challenges facing timber and honey dealers**

Table 3.2 presents the findings regarding various challenges faced by timber and honey dealers. The results indicate that theft is a significant issue, with approximately 59% of the respondents reporting it among honey dealers and 41% among timber dealers.

Theft is the least prevalent challenge among timber and honey dealers, accounting for only 9.8% of the total challenges. The lack of modern harvesting tools, such as honey harvesters and protective gear, is another obstacle mentioned by around 17% of timber dealers and a higher proportion of approximately 83% among honey dealers. This issue has an overall impact of approximately 10.7% among timber and honey dealers. The lack of local skills, specifically traditional knowledge on beekeeping, poses a hindrance for honey dealers (60%) and timber dealers (40%), resulting in a combined impact of 11.1% among timber and honey dealers.

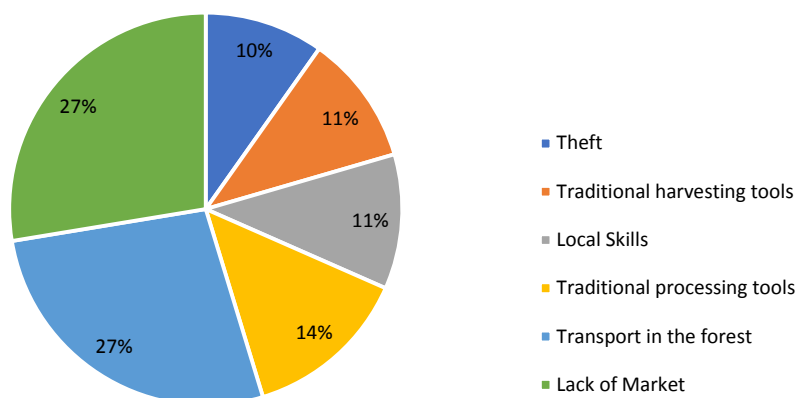
A considerable number of respondents also mentioned the lack of honey processing tools and modern timber processing equipment as a hindrance to production. Around 87% of honey producers reported this issue, which accounted for an overall impact of 13.7% and ranked as the third most challenging issue in the field of production. Regarding transportation challenges in the forest, timber dealers faced more difficulties in transporting products, as reported by 53% of the respondents. Similarly, approximately 48% of honey dealers experienced transportation challenges. This issue had a significant impact, accounting for 27.1% of the overall challenges and ranking as the second most prevalent challenge. The lack of a market had a substantial effect on production, with approximately 44% of honey dealers and 57% of timber dealers reporting this challenge. This issue had an overall impact of around 27.6%, making it the top-ranked challenge faced by both timber and honey dealers in the Songea and Liwale Districts.

**Table 3.2: Challenges facing timber and honey dealers in Songea and Liwale district**

Challenges	Honey(n=37)		Timber(n=71)		Row Total	Overall percentage
	Freq	%	Freq	%		
Theft	13	59.0	9	41.0	22	9.8
Modern harvesting tools	20	83.0	4	17.0	24	10.7
Local Skills	15	60.0	10	40.0	25	11.1
Modern processing tools	27	87.0	4	13.0	31	13.7
Transport in the forest	29	48.0	32	53.0	61	27.1
Lack of Market	27	44.0	35	57.0	62	27.6
Column Total	131	51.2	94	41.8	225	100

Source: field data (2022)

Figure 3.2 displays the comprehensive challenges encountered by honey and timber dealers. The findings reveal that transportation difficulties (27%) and insufficient markets (27.6%) were identified as the primary obstacles to the production of timber and honey, surpassing issues such as theft (9.8%), lack of modern harvesting tools (13.7%), insufficient skills (11.1%), and modern processing equipments (13.7%).



**Figure 3.5: Challenges facing timber and honey dealers**  
Source: field data 2022

### 3.5 Discussion

Results indicate that the majority of respondents in selected villages of the study area were literate though most at primary level. Primary education is a level enough for an individual to understand and adopt new interventions (Paullo, 2007). It has also been reported by Maro (1995) that primary education can foster human creativity, and hence having relationship with farmers' readiness to integrate innovations into traditional systems of land use and management. 91% of respondents were males this implies the low involvement of women in forest enterprises. Similar results were reported by (Augustino *et al.*, 2016) who reported low participation of women in beekeeping activities.

Also, the findings from this study reveal that, the infrastructure condition in both areas are not supportive to both timber and honey production activities. This may be attributed to remoteness of the areas from the town centers. The roads network available makes difficulties to transport products especially during the rainy season. And also, mostly in village areas they use solar energy as a source of electricity which is not efficient in running the machines for the enterprises. These findings are similar to Obokoh and Goldman (2016) who reported that poor infrastructure constrains development of forest enterprises. It is important to note that good conditions of infrastructure favour the development and success of any enterprise.

The majority of forest product dealers in both Songea and Liwale districts have undergone training, which has proven to be beneficial in enhancing their skills and capabilities. Training and extension services play a vital role in improving the knowledge and capacity of workers in small industries (Guadagno *et al.*, 2019). However, despite the positive impact of training, there is a lack of information concerning tenders and raw materials in both districts, indicating a lower level of development in these aspects.

The absence of comprehensive information on tenders and raw materials suggests that there are challenges or gaps in the procurement and supply chain processes within the small forest enterprises in Songea and Liwale districts. This lack of information may hinder the growth and development of the industry, affecting its overall competitiveness and productivity.

Interestingly, the findings of this study differ from those reported by Mfilinge (2021), who highlighted that training programs accounted for a smaller percentage compared to other information related to tenders and raw materials in the furniture industry. This discrepancy suggests variations in the research findings and the specific contexts of the studies conducted. It also emphasizes the importance of considering multiple sources of information and conducting further research to gain a comprehensive understanding of the challenges and opportunities within the industry.

The disparity in financial access, particularly in terms of loans, for timber and honey traders between Songea and Liwale districts can be attributed to the difference in the timing of activity initiation. The earlier start in Liwale allowed traders to establish relationships with financial institutions and demonstrate their creditworthiness, while traders in Songea had less time to build such connections and face challenges in accessing loans. Understanding these factors can help inform efforts to improve financial access for traders in both districts, ensuring a level playing field and equal opportunities for business growth. A study by Pandit *et al.* (2009) conducted in Nepal reported majority of forest enterprises receives loans to run their activities. A study by PFP reported forest enterprises have accessibility to loans from banks. Awono *et al.* (2003) reported that SMFEs face difficulties in accessing credit to enable processing and scaling up of operations. Many SMFEs use local saving schemes, but often this does not provide sufficient capital or the long-term loans needed for investments.

The findings of this study reported lack of market as the major challenge for both timber and honey dealers. Lack of market was also reported by Msolla (2020) as the main constraints in developing honey production in Songea District. Contrary to Arvola *et al.* (2019) a study conducted in Mufindi district reported that market access was not a constraint in timber marketing. This may imply that enterprises from natural forest are less advanced than enterprises for plantation.

### **3.6 Conclusion and Recommendations**

#### **3.6.1 Conclusion**

The research findings regarding the supportive functions for timber and honey enterprises indicate that the infrastructure conditions are not adequately supportive. Additionally, the information flow primarily focuses on training issues, and the financial support provided is insufficient. The assessment of infrastructure conditions reveals that the current state does not effectively support the operations of timber and honey enterprises. This implies that there are limitations in terms of transportation infrastructure, access to markets, and other crucial facilities necessary for efficient production and distribution. Furthermore, the analysis of information flow indicates that there is a significant focus on training-related matters, which may not adequately address the information needs of timber and honey dealers. It is essential to broaden the scope of information flow to cover various aspects such as market trends, technological advancements and tender related issues. This would enable the enterprises to make informed decisions and adapt to changing market dynamics. In terms of financial support, the research findings suggest that the current level of assistance provided to timber and honey enterprises is inadequate. Insufficient financial support can hinder the growth and development of these enterprises, limiting their ability to invest in modern equipment, training, and expansion. It is crucial to explore avenues for increased financial support, such as accessing loans, grants, or subsidies, to ensure the sustainable growth of timber and honey enterprises.



### **3.6.2 Recommendations**

Based on the research findings, the following recommendations are proposed to enhance the supportive functions for timber and honey enterprises:

- i. **Improve infrastructure conditions:** Efforts should be made to enhance transportation infrastructure, provide better access to markets, and address any other infrastructure-related limitations that hinder the efficient functioning of timber and honey enterprises.
- ii. **Broaden information flow:** Expand the scope of information dissemination beyond training-related issues. Establish channels to provide timely and relevant information on market trends, technological advancements, tender issues that can benefit timber and honey dealers.
- iii. **Increase financial support:** Explore opportunities for increased financial support, such as securing loans, grants, or subsidies, to assist timber and honey enterprises in investing in modern equipment, training programs, and expansion initiatives.

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## CHAPTER FOUR

### 4.0 General Discussion

Objective of this study was to explore the contribution of forest products, specifically timber and honey, to the livelihoods of communities residing adjacent to Village Land Forest Reserves. Assessing the contribution of forest products to the livelihood improvement is vital for enabling evidence-based policy formulation and decision-making processes. It provides policymakers with crucial information regarding the socioeconomic value of forests and their potential impact on local communities. The results highlighted the importance of these products in enhancing livelihood assets and improving overall well-being.

The study found that improved education facilities, improved healthcare, and food security significantly contribute to better physical assets in communities near Village Land Forest Reserves. Having a designated saving place does not directly impact financial assets, but higher savings show a positive trend. Household income contributions do not significantly affect financial assets. Limited training opportunities negatively impact human assets, while the source of knowledge has no direct impact. Active membership participation positively influences social assets. These findings highlight the importance of education, healthcare, food security, savings, training, and membership participation due to timber and honey activities in enhancing livelihood assets and hence improvement in livelihoods.

## **CHAPTER FIVE**

### **5.0 Conclusion and Recommendations**

#### **5.1 Conclusion**

The overall objective of the study was to assess the contribution of timber and honey forest products towards livelihood improvement. By using descriptive statistics and a binary logistic regression, the study found that, we have enough to reject null hypothesis one ( $H_0$ ) which states that; Timber and honey production do not contribute significantly to the livelihood of communities adjacent to VLFRs.

The study affirms the positive contribution of forest products to livelihoods, highlighting their role in income generation, poverty alleviation, and cultural preservation. However, challenges related to supporting infrastructures impede the full potential of forest product enterprises. By recognizing these challenges and implementing targeted interventions, we can create an enabling environment that maximizes the benefits of forest products for local livelihoods, ensuring sustainable development and improved well-being for forest-dependent communities.

#### **5.2 Recommendations**

Following the conclusion of this study, it is recommended that:

- i. To ensure the sustainable development of forest products businesses and enhance livelihood improvement, it is crucial to strengthen the capacity of the forest sector, particularly in district-level. This can be achieved by providing comprehensive financial and technical support, which will lay a strong foundation for maximizing the benefits derived from forest products.
- ii. Currently, the forest sector in district-level VLFRs faces challenges due to limited financial assistance. This inadequate funding hampers their ability to effectively engage in forest products business and meet the needs of local communities. Consequently, they often rely heavily on time-oriented donor

support, which may not provide long-term solutions for sustainable livelihood improvement.

- iii. By bolstering financial assistance, the forest sector in district-level VLFRs can access the necessary resources to invest in infrastructure, technology, and capacity building. Increased financial support will enable them to develop sustainable business models, enhance value chains, and create employment opportunities. Moreover, it will empower local communities to actively participate in forest-based enterprises and reap the full benefits of their natural resources.
- iv. The study was conducted in two districts, with distinct socioeconomic and environmental characteristics, and on specific forest products (timber and honey). It is hence rather difficult to predict the extent to which the study findings can be applied in other places and for other forest products. Thus, care has thus to be taken in generalizing the study findings for other study areas. Further studies should include other forest products from different districts to facilitate comparison and generalization of the findings. This would give a more comprehensive report on forest products contribution to livelihood improvement.

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## APPENDICES

### Appendix 1: Supporting functions for honey and timber dealers

#### General Information

Region..... District..... Ward.....

Village name..... Date.....

Respondent category: .....

Sex..... Age.....

Education level .....


#### Supports provided to honey and timber producers

What is your experience on production of honey/ timber?

0 – 5 years

6 – 20 years

More than 20 years

How many employees (including you) do you have?

1 – 4

5 – 49

50 – 99

100 and above

How many training/exhibition do you attend per year?

1 – 5

6 – 20

21 and above

What are the basis of trainings offered? (tick all which apply)

Sustainable forest harvesting

Forest enterprises

Beehives installations

Honey harvesting processing and marketing

Do you have access to loan and/or grant?

Yes

No (Proceed to 6)

If yes how is it located? And how do you use the offered loan? Use the following table

Financial support (Mark ✓ all appropriate options)	Mode of allocation (Mark ✓ where appropriate)	Uses (List up to 3 uses)	
	Individually	Group	
Grant			<ul style="list-style-type: none"> <li>• .....</li> <li>• .....</li> <li>• .....</li> </ul>
Loan			<ul style="list-style-type: none"> <li>• .....</li> <li>• .....</li> <li>• .....</li> </ul>

What type of information are you receiving? (Select all that apply)

Tender

Financial issues

About raw material (timber)

Training/exhibition

Others (specify) .....

From whom do you get the named information?

Are there any financial service you are able to access?

Yes

No

If yes which services do you get?

What any other supports do you get? Tabulate your response as shown below with respective supporters/facilitators

Support category	Description	Supporters
Trainings		
Modern harvesting tools		
Market access		
etc		

## **Appendix 2: Contribution of honey and timber production on livelihoods**

### **Human Capital**

How many household members do you have? .....

How did you obtain skills and experience about honey/timber activities?

NGOs ( ) ii. Friends/Neighbors ( ) iii. Relatives ( ) iv. Govt Organization ( )

Do you receive any training regarding honey/timber activities? i. Yes ( ) ii. No ( )

If Yes, Who offers trainings?

What kind of training i) Technical training ii) Business training iii) Both

### **Social Capital**

1. Are you a member of any organization?

i. Yes ( ) ii. No ( )

2. If yes, which type of organization?

i. NGO ( ) ii. Voluntary organization ( ) iii. Cooperative organization ( )

iv. Govt. org ( ) v. Club ( ) vi. School Committee ( ) vii. Religious Committee

### **Financial Capital**

Amount of honey collected per season .....

How much you sell.....

Who are your main customer?

Wholesalers ( ) ii. Retailers ( ) iii. Processors ( ) iv. End-users ( )

Total cash income .....

Timber/honey business has contributed to household income

A) Strongly disagree B) Disagree C) Neutral D) Agree E) Strongly agree

6. Do you save money obtained from selling honey/timber?  
i. Yes ( ) ii. No ( )
7. If yes, how often do you save money?  
i. Daily ( ) ii. Weekly ( ) iii. Monthly ( ) iv. Yearly ( ) v.  
No specific time ( )
8. Where do you save money?  
i. Commercial Banks ( ) ii. Local cashbox ( ) iii. Others (specify)  
.....

### **Physical capital**

1. Timber/honey business has contributed to better education  
A) Strongly disagree B) Disagree C) Neutral D) Agree  
E) Strongly agree

Timber/honey business has contributed to better health care  
A) Strongly disagree B) Disagree C) Neutral D) Agree  
E) Strongly agree

Timber/honey business has contributed to food security  
A) Strongly disagree B) Disagree C) Neutral D) Agree E) Strongly agree

### **Natural Capital**

5. How do you ensure forest sustainability/bee sustainability in the forest?

.....  
.....

**Appendix 3: Checklist for key informant**

How do honey/timber production contribute to forest management?

.....

How did you get the supports

.....

.....

.....

**“THANK YOU FOR YOUR COOPERATION”**

