

**GENDERED LIVELIHOOD OUTCOMES FROM WOODLOTS IN MUFINDI  
DISTRICT, TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN RURAL  
DEVELOPMENT OF SOKOINE UNIVERSITY OF AGRICULTURE.  
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## EXTENDED ABSTRACT

Woodlot farming has potential of improving livelihood of both women and men. However, little is known on the extent to which woodlot benefits the livelihood of women and men in Mufindi District. The study was conducted to examine gendered livelihood outcomes from woodlots. The specific objectives were to describe roles played by women and men in woodlot farming, to assess factors affecting women and men woodlot ownership, to analyze and compare woodlot livelihood outcomes of women and men with and without woodlots. The study was conducted in Mufindi District and adopted a cross-sectional research design, involving 120 respondents. Slightly more than half (53.3%) of respondents were woodlots owners and 46.7% were non-woodlots owners. Descriptive statistical analyses were used to compute women and men roles in woodlot farming, factors affecting women and men woodlot ownership and to establish livelihood outcomes in woodlot farming. Binary logistic regression was used to establish the factors affecting woodlot ownership. T-test and Chi-square tests were used to compare the livelihoods outcomes. Land ownership was found to be a major factor affecting woodlots ownership. Binary logistic regression revealed that total land acreage was a key predictor of woodlot ownership ( $P < 0.05$ ). Gender distribution of roles revealed that men dominated land preparation, thinning, pruning, harvesting, transportation and price negotiation while women dominated in seed preparation and weeding. Woodlots owners had better livelihood outcomes (higher income, more asset and better housing conditions) compared to their counterparts non woodlot owners. The T-test and Chi-square tests revealed that there is significant difference in livelihood outcomes of women and men with and without woodlot ( $P < 0.05$ ). The study recommends that individuals and community to acquire land through purchasing parcels of lands and or leasing land. Village Assembly and Village Council should distribute village land to villagers at reasonable cost. Also

individuals, community, governmental and non-governmental organisations should increase efforts to sensitize and promote women involvement in performing woodlot farming activities by creating awareness through gender sensitizations programmes that target both women and men with emphasize on women involvement in woodlot farming and promote individuals and community to engage in woodlot related activities like timber and poles selling for better livelihood outcomes through investing in woodlot farming.

## DECLARATION

I, **ARDOLF BAHATI TWEVE**, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work done within the period of registration and that it has neither been submitted nor being concurrently submitted for a degree award in any other institution.

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Date

The above declaration is confirmed by

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Date

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## **DEDICATION**

This work is dedicated to my parents, my late father Mr. Bahati Tweve, my mother Subira Chussu and my young brothers Nahumu Tweve and Ebasony Tweve.

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**LIST OF ABBREVIATIONS AND ACRONMYS**

CARE	Cooperative for American Relief Everywhere
CSSH	College of Social Sciences and Humanities
DDS	Department of Development Studies
DFID	Department for International Development
ESMAP	Energy Sector Management Assistance Program
HHH	Household head
MDC	Mufindi District council
SPSS	Statistical Package for Social Sciences
SSA	Sub Saharan Africa
SUA	Sokoine University of Agriculture
TZS	Tanzanian shillings
TDV	Tanzania Development Vision
TFYDP	Tanzania Five Year Development Plan
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
USA	United States of America

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

The importance of woodlots to rural communities' livelihood cannot be overemphasized. Woodlots are important for fuel wood, food, medicines, maintaining fertility of agricultural land, water management, socio-cultural values, income generation and reducing the risk of natural disasters such as landslides and flooding (Otsyina and Asenga, 1999; Muningo, 2010). A woodlot is a piece of land dedicated for tree planting usually located around a household or within a village. A woodlot may be owned by an individual, a household or by a community (Chikoko, 2002). Chhorn *et al.* (2013) highlighted that a woodlot can be established for small scale production of firewood, timber and biodiversity. Woodlots in this study refer to all trees planted by an individual, a family and households as a small plantation for timber production, fuel wood, and poles.

Throughout the world, including Sub Saharan Africa, woodlots provide source of food and economic opportunities for many people. Woodlots also are increasingly recognized for solving energy problems, addressing deforestation and mitigating climate change (Mwakaje *et al.*, 2012). For instance, as the rates of deforestation continue to rise in some tropical countries, governments are committed in finding approaches which can reduce deforestation, provide rural livelihoods and protecting environment; woodlot has been opted as solution to such problems (ESMAP, 2012). Much of effort for solving deforestation, providing rural livelihood and protecting environment in tropical countries including Tanzania have been focusing on the promotion of woodlots by providing incentives that encourage individuals and households to establish and manage their own

sources of wood and non-wood products on their farmlands (Boyd and Banzhaf, 2007; Fisher *et al.*, 2009; ESMAP, 2012).

In Tanzania, Mufindi District in particular woodlot is an important asset to many people especially smallholder farmers (Singunda, 2010; Malimbwi *et al.*, 2010). Growing woodlots in Mufindi District has become popular among smallholder farmers, initially the intention of growing woodlots was to solve the problem of wood shortage, in response to the loss of natural forest and prohibition of using firewood from private companies' forest plantation. Timber production and poles production have changed the intention to market oriented woodlot growing practices over a period of time. Currently, woodlot growing is the best land use option in Mufindi District at farm level, and many people are attracted to practice woodlot farming as an economic activity (Singunda, 2010).

Woodlot farming is characterized by gender differentials from production to marketing of woodlots products (Chikoko, 2002). Gender has been a developmental issue in many developing countries in the sense that, existing gender imbalances and inequalities at the society prevents it from realizing its full potential in all the activities of development including woodlot farming. It is also a social issue as it affects the lives of both women and men (Kiptot and Franzel, 2011; Richard *et al.*, 2014). Gender has been constraining women and men benefiting equally from woodlot farming (Chikoko, 2002). Also, gender relations between men and women influences the division of labour, the use of resources and sharing benefits of production between them (Aregu *et al.*, 2011; Spence, 2012). Gender in this study implies relationship and responsibilities between men and women in woodlot farming.

The gender inequalities between women and men in woodlot farming cannot be taken as a normal situation but as a hindrance of woodlot productivity and equal benefits realized from woodlots farming among women and men. Evidence from literature suggest that gender differences in woodlot farming affects access to, and control over woodlot products as well as decision-making power among men and women and woodlot productivity in general (Chikoko, 2002; Kiptot and Franzel, 2011; Mwakaje *et al.*, 2012). Therefore, this study examined how woodlots benefit women and men. In order to understand this it requires to examine woodlots ownership, activities and benefits from woodlots farming.

Several studies on woodlot farming have shown that men are usually interested in woodlot for commercial purposes while women are more inclined to woodlots for subsistence use such as firewood (Chikoko, 2002; Kiptot and Franzel, 2011). As well, women's rights to tree products are usually limited to products that are considered to have little or no commercial value but the moment woodlot products with little or no commercial value become more valuable they are usually taken over by men. Men reserve higher value products for themselves (Kiptot and Franzel, 2011). The products that women control are mainly firewood, fodder and mulch while men control timber and poles (Chikoko, 2002; Kiptot and Franzel, 2011). In terms of use, more men than women use timber products. However, little is known about livelihoods of women and men in woodlot farming. Also relatively less attention is paid to how women and men are being involved in woodlot farming.

Furthermore, despite the fact that woodlot related activities in Tanzania are done by both women and men from nursery and or seed preparation, preparation of farms for tree planting, managing, harvesting, processing and marketing, still women receive unequal rewards from their effort (Mwakaje *et al.*, 2012). For example, even though women and



men are involved in woodlot farming, selling of timber and poles fall under the shoulders of the household head who are usually men and who always dictate how revenues are spent while women are mainly involved in carrying raw timber by head to the roadside for transportation to marketing points (Richard *et al.*, 2014).

Woodlots are potential in improving livelihoods for woodlot dependent communities by contributing to livelihood outcomes including but not limited to food security, health and wellbeing and income (Paulo, 2007). Livelihood outcomes from woodlots farming are secured from sale, exchange and consuming of gathered and processed woodlot products such as timber, firewood, timber bucks and poles through lumbering, working for pit sawyers, vending off cuts, carpentry, vending food and making local brew in harvesting of woodlots (Paulo, 2007; Chhorn *et al.*, 2013). Livelihood outcomes of an individual or household are the results of livelihood strategy or combination of livelihood strategies undertaken by an individual or a particular household (Hudu, 2009; Majale, 2002). Livelihood strategies from woodlots farming involves selling woodlots products, working for woodlot related activities like seed preparation, lumbering and activities that support woodlot farming such as provision of food and drinks, as well as transportation. In the context of this study, livelihood outcomes include increase in income, increased level of asset ownership and better housing conditions. Livelihood outcomes of people in Mufindi District are expected to be improved as result of undertaking woodlot farming as a livelihood strategy through sale, exchange of woodlot products like timber, firewood and poles and consuming it in building, cooking, heating and lighting. Therefore this study aimed at examining the gendered livelihood outcomes from woodlot farming in Mufindi District.

## **1.2 Problem Statement**

In Mufindi District, despite the fact that woodlots have attracted individuals, groups and associations and is increasingly becoming an important local land use option, yet the extent to which woodlots benefit the livelihood of men and women is still not well known. For example, according to URT (2011) the livelihoods of many people in Mufindi District are poor in such a way that they have low incomes, low level asset acquisition and low quality houses. Contrary to the expectations that woodlot farming as important economic activity that could have helped people in improving their livelihoods through sale, exchange and consumption of woodlot products like timber, firewood and poles. Therefore, a number of key questions could be raised regarding what might be hindering people benefiting from woodlots farming and transforming woodlots returns into peoples' better livelihood outcomes.

Moreover, the fact that women and men utilize and exploit woodlots differently has been demonstrated in many studies (Otsyina and Asenga, 1999; Chikoko, 2002; Muningo, 2010; Singunda, 2010; Kiptot and Franzel, 2011; Richard *et al.*, 2014). However, the relationship between income, asset acquisition, and housing conditions as a result or impact of woodlot farming among women and men has not been well established. Therefore, this study aimed at exploring the gendered livelihood outcomes from woodlots in Mufindi District.

## **1.3 Justification of the Study**

The findings from this study add new knowledge on gendered livelihood outcomes and woodlots, especially on factors affecting woodlots ownership, how livelihood outcomes of women and men with and without woodlot differ. The findings also inform policy makers, researchers and other development partners involved in planning and implementing

intervention that aim at improving livelihoods and promoting woodlot farming for better livelihood outcomes among women and men.

The empirical findings from the study also contribute to the reflection of Tanzania Five Year Development Plan (TFYDP) 2012/13 to 2016/17 and Tanzania Development Vision (TDV) 2025, in providing information on gender inequality existing in woodlot farming and associated opportunities for better livelihood among women and men in woodlot farming. This is important for realizing goal number one in which it is envisaged to improve high quality livelihoods from available resource with equal participation of men and men in all spheres of life (URT, 2011).

## **1.4 Objectives of the Study**

### **1.4.1 General objective**

The general objective of the study was to examine gendered livelihood outcomes from woodlots farming in Mufindi District, Tanzania.

### **1.4.2 Specific objectives**

Specifically the study sought to:-

- i. Describe the roles played by women and men in woodlot farming.
- ii. Assess factors affecting women and men woodlots ownership.
- iii. Analyze livelihood outcomes in woodlot farming.
- iv. Compare livelihood outcomes of women and men with woodlot and women and men without woodlot.

## **1.5 Research Hypothesis**

The study was guided by one hypothesis:-

- i. Women and men with woodlots are more likely to have better livelihood outcomes than women and men without woodlots.

## **1.6 Theoretical Framework**

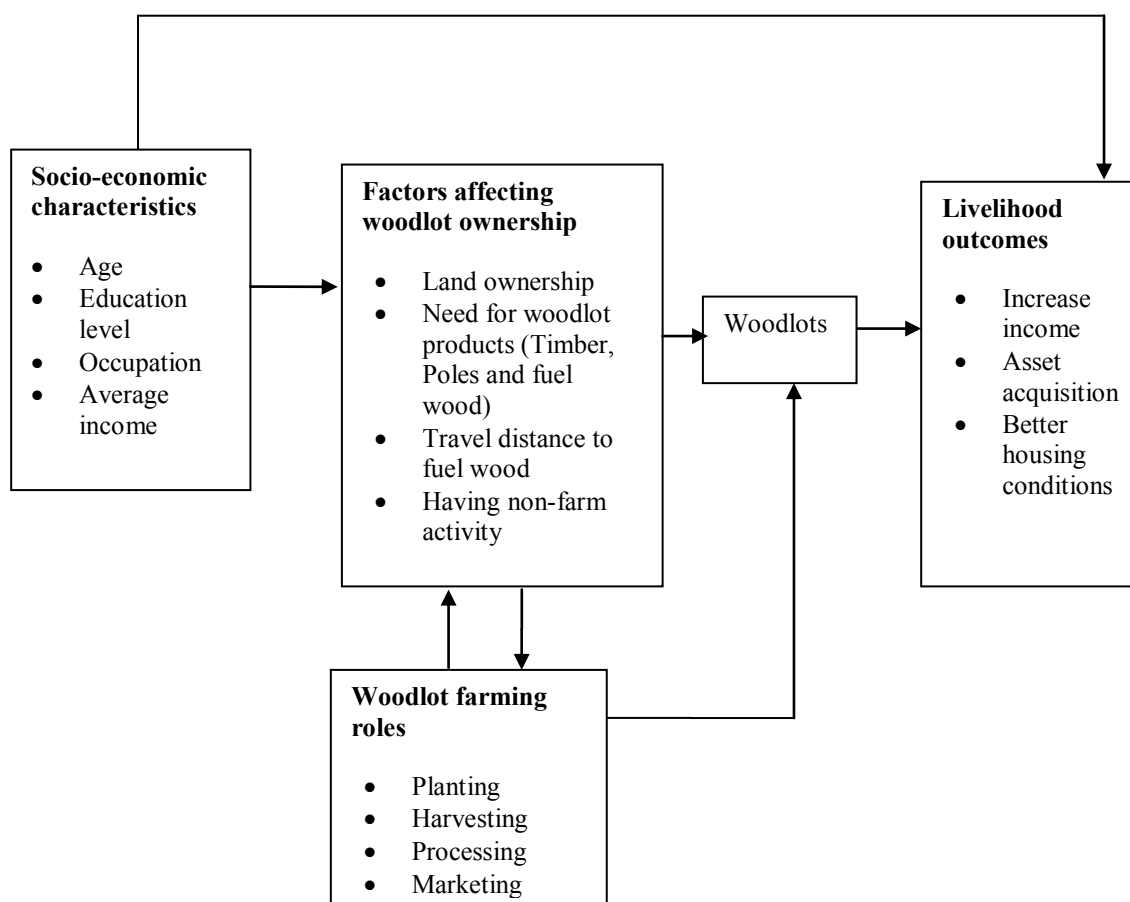
The study is guided by the Sustainable livelihood approach as described by DFID, CARE, Oxfam's and UNDP. DFID, CARE, Oxfam's and UNDP approaches which focus on how the resources are used as an asset to improve human wellbeing and promoting development by considering livelihood asset, process and structures and livelihood strategies to achieve livelihood outcomes (Majale, 2002; Hudu, 2009). Livelihood asset in the context of this study is woodlots which livelihoods of people around it depend on in pursuing their livelihoods. Increasing ownership and right to use woodlots products like whole tree, timber, poles, firewood's and timber bucks are central on contribution of the livelihood outcome of people in woodlots farming which for context of this study include increase in income, asset acquisition and better housing condition. Process and structures are crucial in shaping livelihoods (Levine, 2014). Structures include issues related to level of government and private sector involvement but such analysis was not the focus of this study. Processes determine the way in which individuals operate and interact (Levine, 2014). Process as factors affecting woodlot ownership determines the way in which individuals performing their roles and shapes woodlot ownership.

Asset, process, livelihood strategies and livelihood outcomes as used in this study are major aspects in all DFID, CARE, Oxfam's and UNDP approaches. The approaches situate asset in their broader context and focus on relation between asset and achievement accrued from that asset (Majale, 2001). This was analyzed on the framework to understand how different factors influences woodlots ownership (drivers of asset ownership), woodlot ownership (asset) and achievement from woodlots farming (livelihood outcomes).

## 1.7 Conceptual Framework

Figure 1 presents Conceptual Framework of the study which is built on the DFID, CARE, Oxfam's and UNDP livelihood approaches. Asset used as woodlot in this study, process which is used as factors affecting woodlot ownership and livelihood outcomes which is used as increase in income, increase in level of asset ownership and better housing conditions. It was hypothesized that woodlot as asset aids people to pursue different livelihood strategies which results into attainment of individual or household aspiration that is increase income, increase level of asset acquisition and better housing condition for this study.

Woodlot ownership and woodlot farming roles are interrelated. Changes in woodlot ownership can results into livelihood outcomes, this assumes that if there is essentials for woodlot establishment like land and the need of woodlot products, individuals, households or community might choose to own woodlots; later woodlot are transformed to livelihood outcomes through sale, exchange and consumption of woodlot products. Socio-economic characteristics affect woodlot ownership and determine the extent of livelihood outcomes from woodlot farming (Ndayambaje *et al.*, 2013). For example education level of an individual can influence an individual in owning or not to own woodlot and the higher level of education can help an individual in securing better woodlot income and making good woodlot contracts for better livelihood outcomes.



**Figure 1: Conceptual Framework showing variables influencing livelihood outcomes**

## 1.8 Organization of the Dissertation

This dissertation is organised in four chapters. The first chapter consists of the extended abstract and introduction of the overall theme studied. Chapter two comprises paper one which is about woodlot ownership and gender roles, while chapter three comprise paper two which is about livelihood outcomes in woodlot farming. Chapter four presents the conclusion and overall implication of the entire study's findings.

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**CHAPTER TWO**

**PAPER ONE**

**Woodlot ownership and Gender Roles in Woodlots Farming in Mufindi District,  
Tanzania**

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**Abstract**

Woodlot farming is a gender segregated activity. However scanty information exists on woodlot ownership and gender roles in woodlot farming. This paper was set to assess the woodlot ownership and gender roles in Mufindi District. Using structured questionnaire data were collected from 120 respondents whereby 64 (53.3%) were woodlots owners and 56 (46.7%) were non-woodlot owners. Furthermore, key informant interview was conducted to compliment information on the factors affecting woodlot ownership and women and men roles in woodlot farming. Descriptive statistical analyses were used to identify factors affecting women and men woodlot ownership and women and men roles in woodlot farming. Land ownership was found to be a major factor affecting woodlots ownership. Binary logistic regression analysis revealed that the acreage of land owned was a key predictor of woodlot ownership ( $P < 0.05$ ). Men dominated land preparation, thinning, pruning, harvesting, transportation and price negotiation activities while women dominated seed preparation and weeding activities. Therefore, it is recommended that individual, households and community to purchase parcels of lands and or lease land. Village Assembly and Village Council should distribute village land to villagers at reasonable cost. Also, governmental and non-governmental organisations should increase effort to sensitize and promote women involvement in performing woodlot farming activities by creating awareness through gender sensitizations programmes that target both women and men with emphasize on women involvement in woodlot farming.

**Keywords:** Woodlots ownership, gender, gender roles

## INTRODUCTION

The significance of woodlots to rural communities' livelihood cannot be overstated. Woodlot provides material benefits like timber, poles and firewood's that could support the livelihoods of the communities (Chikoko, 2002; Maningo, 2014). As well, woodlots are increasingly recognized for their contribution to solving energy problems, enhancing biodiversity conservation, addressing deforestation and mitigating climate change. Some analysts have suggested that farmers should respond to decreasing access to and declining agricultural productivity by engaging in woodlot farming and woodlots must be considered a fundamental asset for the livelihoods of rural household (Hansen and Top, 2006; Ndayambaje *et al.*, 2013; Muningo, 2010). However, woodlot as other type of farming is characterized with gender differentials from production, access, control, ownership and marketing of gathered and processed woodlots products (Chikoko, 2002). The gender differences in woodlot farming cannot be taken as a normal situation but as a hindrance of woodlot productivity and equal benefits realized from woodlots farming among women and men. Gender in this paper implies relationship and responsibilities between men and women in woodlot farming.

Throughout the world, distribution of woodlots ownership is heavily skewed toward men. For example, 70 to 90 percent of formal owners of woodlots are men in many SSA countries including Tanzania (Hansen *et al.*, 2005), and similar patterns are seen in Asian countries (Hyde *et al.*, 2000; Predo and Francisco, 2006). Also, women woodlot ownerships are also mediated by their relationships with men (Martin, 2009). Thus, when women are widowed or divorced, they may lose their woodlot ownership. However, less attention has been paid on the factors affecting woodlot ownership among women and men (Ndayambaje *et al.*, 2013).

In woodlots farming both women and men play important roles. However, these roles are differentiated by gender (Chikoko, 2002; Jacob *et al.*, 2010; Mgeni, 2014). Experience shows that traditions and social-cultural norms driven by patriarchy system are affecting roles played by women and men in woodlot farming as it is in many production activities. As a result traditions and social-cultural norms have been conditioning men's and women's roles in woodlot farming (Martin, 2009; Jacob *et al.*, 2010; Kiptot and Franzel, 2011). Moreover a review of literature reveals that women and men roles in woodlot farming vary significantly over time, types of trees and among different communities, and is usually dynamic (Chikoko, 2002; Kiptot and Franzel, 2011). Therefore, it is imperative to understand and capture women and men roles in woodlots farming in a given time.

Several studies have acknowledged the fact that women are the largest group of woodlots users and are at the greatest risk of losing benefits from woodlots resources or not receiving their fair share of compensation from woodlot compared to men (Martin, 2009; Jacob *et al.*, 2010; Kiptot and Franzel, 2011). Also, in cases where women have right and benefits, their right and benefits they derive from woodlot farming are often violated and their contribution to the economy is not recognized compared to men (Chikoko, 2002). The gap between largest groups of users and who benefits from woodlot farming among women and men affect productivity of woodlot farming. Also the gap often results to women's limited access to woodlot resources, which generate implications for woodlots management and productivity at all (Kiptot and Franzel, 2011). Therefore, this paper is aimed to find evidences on woodlot ownership and gender roles in woodlot farming.

### **Methodology**

The study was conducted in Mufindi District in Iringa region. Four villages were selected purposely from two wards due to actively involvement in woodlots farming and leading in

woodlots products sale. The Wards selected were Ihalimba and Mdabulo; the Villages selected were Vikula, Nudwe, Ludilo and Ihefu. Mufindi District is a leading district in woodlot farming in Tanzania (Singunda, 2010).

The study adopted a cross-sectional research design. The sampling unit was individual women and men with woodlots and those without woodlot. Data were collected using structured questionnaire, the sample of 120 respondents were involved in this study where 64 (53.3%) woodlot owners where by 29 (24.0%) were women and 35 (29.3%) were men and 56 (46.7%) non-owners whereby 29 (24.2%) were women and 27 (22.5%) were men. Key informant interview was used to collect qualitative data. Key informants interviewed were the Agricultural Extension Officers, leaders of woodlots owner groups, community development officers, Village and Ward leaders to complement information on factors affecting woodlot ownership and gender roles in woodlot farming. Data were processed by using SPSS Version 20 and Microsoft excel. Descriptive statistical analyses (Frequency and Percentages) were used to compute the factors affecting woodlots ownership and gender roles in woodlot farming while binary logistic regression was used to show factors affecting woodlot ownership. The binary logistic regression used is described below

The model used was:-

$$\text{Log} (p/1-p) = B_0 + B_1X_1 + B_2X_2 \dots\dots\dots + e_i$$

Where: -  $\text{Log} [p/(1-p)]$  is a Logarithm of the odds of factor of owning woodlot against not owning woodlot

P chance that an individual owning woodlot

$$B_1X_1 + B_2X_2 + B_3X_3 \dots\dots\dots B_n \text{ Constant Coefficient}$$

e = Error term

$X_1 - X_n$  = Predictors

$X_1$  = Age (measured in years)

$X_2$  = Sex (0 = if female, 1 = if male)

X3= Marital status (1 = if married, 0 = Otherwise)

X4= Level of education (0= Non formal education, 1 = Formal education).

X5= Average income (measured in Tanzania shillings per month)

X6= Total acreage of land owned (measured in acres)

X7= Engaging in non-farm activities (1 = if is a factor, 0 = if is not a factor)

X8=Distance from firewood (measured in kilometers)

## **Findings and Discussion**

### **Socio- Demographic Characteristics of the respondents**

Finding on socio-demographic characteristics are presented in Table 2.1 which reveal that most of woodlots owners were aged between 36- 40 years while majority of non-woodlots owners were more than 50 years old. This implies that majority of woodlots owners are younger compared to non-woodlot owners. This may be attributed to the fact that woodlot farming is an economic activity which has been practiced in the recent years, so the adoption to people older than 50 years is slow compared to the age group of 36-40 years (Simon, 2005). Moreover, majority of respondents (87.5%) both woodlots owners and non-woodlots owners were married. The high marriage rate can be explained by the fact that in most rural areas in Tanzania most of men and women marry once they have completed their primary school education (Gonzalez, 2003). However, majority of women woodlots owners (14.2%) were single, divorced, separated and household heads compared to married and women in male headed households. This implies that majority of unmarried women are woodlots owners this may be attributed to the fact that they have greater freedom to decide to engage in woodlot farming in absence of their partners or husbands compared to their counterparts who are married (Chikoko, 2002). Moreover, findings show that more than three quarters (78.3%) of respondents had primary education. These results concur with Lwoga *et al.* (2011) who found that majority of rural people have attained primary education.

**Table 2.1: Distribution of Socio- Demographic characteristics of respondents in percent (n=120)**

Variable	Categories	Woodlot ownership		Total
		Owners	Non owners	
Age	20 -25 years	0.8	0.9	1.7
	26 -30 years	7.1	2.7	9.8
	31- 35 years	7.8	3.5	11.3
	36- 40 years	18.3	5.4	23.7
	41- 45 years	7.7	4.4	12.1
	46 – 50 years	6.8	9.8	16.6
	50 > years	1.5	23.3	24.8
Sex	Male	30.0	22.5	52.5
	Female	23.3	24.2	47.5
Marital status	Single	5.0	5.8	12.5
	Married	44.2	41.6	87.5
	Divorced	0.8	0.8	1.7
	Separated	0.8	0.8	1.7
	Widower / widow	2.5	2.5	2.5
Type of marriage	Monogamy	27.5	37.5	65.0
	Polygamy	20.8	8.3	29.2
Education level	No formal education	0.0	7.5	7.5
	Primary education	40.8	37.5	78.3
	Secondary education	10.0	1.7	11.7
	Technical / Diploma	2.5	0.0	2.5
Relation with HHH	Household head	45.0	30.0	75.0
	Spouse	7.5	15.8	23.3
	Brother /sister	0.8	0.0	0.8

### Size of woodlots

In Mufindi District woodlot owners generally had small plots of woodlot whereby 85.9 % of the woodlots owners had woodlots plots of less than 10 acres while 9.4% had woodlots plots of between 10.1 - 20 acres and very few respondents 4.7% had woodlots plots more than 20 acres. This implies that majority of woodlots owners are smallholders. This may be attributed to fact that land is a scarce and inadequate income. According to key informant interview land scarcity and inadequate income are constraining farmers to expand the woodlot size. This result is in line with (Malimbwi *et al.*, 2010) who found



majority of woodlot owners 94% in Makete District had their woodlot size of less than 10 acres.

### **Trees grown in the study area**

Farmers have varying needs and preferences for planting different types of trees. Also farmers consider their different objectives as the criteria for planting a specific tree for example; Pines are the most preferred trees for timber while Eucalyptus is being used for firewood and poles. The findings show that majority of respondents (69.6%) are growing pines, while 25.0% are growing eucalyptus and 5.4% are growing cypress. Respondent's preference of pines over eucalyptus and cypress is attributed to the fact that pines are marketable, take short time to mature while eucalyptus has low market, causes land degradation and perennial and cypress take long time to mature 25-30 years (Singunda, 2010).

### **Type of woodlot ownership**

Type of ownership which woodlot plots is held in Mufindi District is highly dominated by individual ownership, whereby 45.3% of woodlots owners reported that their woodlot fall under individual ownership while 35.9% woodlots owners reported that woodlot ownership is under joint ownership which includes husband and wife ownership and (18.8%) of woodlots owners reported that their woodlot is under family ownership. However, the findings shows that majority of unmarried women their practiced individual ownership compared to married women whose type of woodlot ownership fall under joint ownership of husband and wife. This can be explained perhaps that unmarried women had greater autonomy for woodlot ownership with absence of and or husband's away or greater need for the supplemental income provided by woodlot (Chikoko, 2002).

### Factors affecting women and men woodlots ownership

The results in Table 2.2 show that land ownership is a major factor affecting woodlots farming. This means land ownership influences woodlot farming. This may be due to the fact that land is a basic prerequisite for establishing woodlots. The finding is in line with Muningo (2010) who found that land ownership is a major factor determining woodlot farming. Furthermore, findings show that the need for timber affects more men woodlot ownership compared to women, while long distance search for firewood affects more women woodlot ownership than men. This may be due to the subordination that men aim at high value woodlot products while women inclined to woodlot products with little or no commercial value for subsistence use such as firewood (Chikoko, 2002).

**Table 2.2: Factors affecting women and men woodlots ownership in percent (n=120)**

Factors affecting woodlot ownership	Men		Women	
	Frequency	Percent	Frequency	Percent
Land ownership	31	22.3	25	21.7
Adequate income	25	18.0	22	19.1
Inadequate capital	21	15.1	22	21.7
Timber need	18	12.9	9	7.8
Improve land	13	9.4	9	7.8
Long distance search for fire wood	13	9.4	16	14.0
Lack of non-farm activities	10	7.2	6	5.2
Poles need	8	5.8	6	5.2

The findings from binary regression from Table 2.3 where eight predictors involved reveal that only one predictor (Total acreage of land) was statistically significant ( $P < 0.05$ ) while other seven predictors (age, sex, marital status, education level, engaging in non-farm activities and distance from firewood source) were not statistically significant ( $P > 0.05$ ). The result implies that the total acreage of land owned by an individual had effect on woodlot ownership while the other predictors had no effect on woodlot ownership. It is

logical to argue that the more land an individual owns, the more likely higher chance he or she has in woodlot ownership. Also the results reveal that in increase or change in one unit of age and education level reduces a probability of woodlot ownership by one unit while increase in one unit or change of marital status, average income, distance from firewood source and engaging non-farm activities increases a probability of woodlot ownership by one unit. The findings concur with Emtage and Suh (2004) who found that total acreage of land owned is major factor affecting woodlot ownership.

**Table 2.3: Binary logistic regression result on factor affecting woodlot ownership**  
(n = 120)

<b>Variables</b>	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>Sig.</b>	<b>Exp(B)</b>
Age	-0.002	0.151	0.000	0.991	0.998
Sex	14.036	7.885	3.169	0.075	1272.387
Marital status	5.350	3.870	1.911	0.167	210.581
Education level	-13.414	105.889	0.000	0.999	0.000
Average income	0.000	0.000	1.308	0.253	1.000
Total acreage of land owned	10.138*	4.950	4.195	0.041	2527.372
Engage in non-farm activities	0.338	2.063	0.027	0.870	1.403
Distance from firewood source	1.331	1.707	0.608	0.436	0.264

\* means significant at the 5% level, lowest level of significance

### **Gender roles in woodlot farming**

The results from Table 2.4 show that thinning, pruning, transportation, market searching and price negotiations are done by both women and men. However, men dominate these activities compared to women. Harvesting is done by men only. Also majority of men (65.8%) dominate in land preparation. The reasons may be these activities are traditionally referred as men responsibilities, requires expertise, closer to money and more rewarding.

Moreover, Table 2.4 shows that seed preparation and weeding are done by women mostly with little involvement of men. Planting activity is shared by both women and men. This implies that men are a major workforce in woodlots farming compared to women. This may be explained due to men involvement in woodlot production activities both in their plots and as labourers in other peoples plots (Chikoko, 2002). These findings concur with Jacob *et al.* (2010) who observed that men constitute major workforce in forest activities especially in land preparation, thinning, pruning, and harvesting compared to women. This was also emphasized during key informant interview “*Land preparation, pruning, harvesting, transportation, price negotiation and market search are men’s responsibilities while nursery and weeding are women’s responsibility.*” (Agricultural Extension Officer).

**Table 2.4: Women and Men roles in woodlot farming (hours/day) in percent (n=120)**

Activities	Time (hours)	Women	Men	Both women and men	Total
Nursery	2 -4	36.7	30.8	3.3	70.8
	5 -7	20.0	9.2	0.0	29.2
Land preparation	5 -7	0.8	35.0	20.8	56.6
	8 -10	0.0	30.8	12.5	44.4
Planting	5 -7	0.0	0.0	25.8	25.8
	8 -10	3.3	4.2	66.7	74.2
Thinning	2 -4	0.0	6.7	4.2	10.9
	5 -7	3.3	62.5	17.5	83.3
	8 -10	1.7	2.5	1.7	5.8
Pruning	2 -4	0.8	9.2	2.5	12.5
	5 -7	0.8	59.2	27.5	87.5
Weeding	2 -4	1.7	0.8	1.7	4.2
	5 -7	44.2	4.2	15.8	64.2
	8 -10	21.6	2.5	7.5	31.6
Harvesting	5 -7	0.0	2.5	0.0	2.5
	8 -10	0.0	97.5	0.0	97.5
Transportation	5 -7	0.0	28.3	0.8	29.2
	8 -10	0.0	65.8	5.0	70.8
Searching for market	2 -4	0.8	23.3	44.1	68.3
	5 -7	0.0	15.8	14.1	30.0
	8 -10	0.0	0.0	1.7	1.7
Price negotiation	2 -4	5.0	85.0	7.5	97.5
	5 -7	0.0	2.5	0.0	2.5

The findings from Table 2.4 also show that there are differences in number of hours spent in each activity performed whereby men have high proportion of labour and time contribution than women in woodlot farming activities. This is because women bear heavy domestic workload and high involvement in production of food crops thus most of time women use to perform domestic activities and involve in production of food crops compared to men who have ample time. Similar trend has also been reported by Mgeni (2014).

## **CONCLUSIONS AND RECOMMENDATIONS**

On the basis of the findings it is concluded that land ownership is a major factor affecting woodlot ownership and the total acreage of land owned is the key predictor of woodlot ownership.

Men dominates land preparation, thinning, pruning, harvesting, transportation and price negotiation, while women dominates seed preparation and weeding activities; planting activity is shared by both women and men. Therefore, men are the major workforce in woodlot farming activities.

The study recommends that individual and households to acquire land through purchasing parcels of lands and or leasing land. Village Assembly and Village Council should distribute village land to villagers at reasonable cost. Moreover individuals, community, government and non-governmental organisations should sensitize and promote women involvement in performing woodlot farming activities by creating awareness through gender sensitizations programmes that target both women and men with emphasize of women involvement in woodlot farming.

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**CHAPTER THREE**

**PAPER TWO**

**Livelihood outcomes among men and women in woodlot farming: A case of Mufindi**

**District, Tanzania**

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**Abstract**

Woodlot farming is an important economic activity in improving livelihoods of many people by contributing their improved livelihood. The study was conducted in Mufindi District to assess the livelihood outcomes among women and men engaged in woodlot farming, a comparison was made between women and men with and without woodlot. The study adopted cross sectional research design where structured questionnaires and key informant interview were used to collect data from 120 respondents. Descriptive statistical analysis was used to establish livelihood outcomes from woodlot farming while Wealth index was used to compute asset ownership and the T-test and Chi- square tests were used to compare livelihood outcomes. The study found that woodlots owners had better livelihood outcomes (higher incomes, had more assets and better housing conditions compared to their counterpart's non-woodlot owners. The T-test and Chi- square tests revealed that there is a difference in livelihood outcomes between women and men with and without woodlot whereby income, asset values and housing conditions were statistically significant ( $P < 0.05$ ). In general the women and men with woodlot had more income, more asset and houses of better quality compared to their counterparts without woodlot. The study recommends that individuals and community in general to engage in woodlot related activities such as timber and poles selling as their major economic activities for better livelihood outcomes. Also the government and non-governmental organisations to promote woodlot farming through investment by creating conducive environment for woodlot production through providing soft loans, construction of transport and communication system and expertise in woodlot practices for better livelihoods outcomes.

**Keywords:** Livelihood, Livelihood outcomes, woodlot farming

## INTRODUCTION

Woodlots are important in improving livelihoods for woodlot dependent communities by contributing to livelihood outcomes including food security, health, wellbeing and income (Paulo, 2007). Livelihood outcomes from woodlots farming are derived from sale and exchange of gathered and processed woodlot products such as timber, firewood, timber bucks and poles through pitsawying, working for pit sawyers, vending off cuts, carpentry, vending food and making local brew in harvesting of woodlots (Paulo, 2007; Chhorn *et al.*, 2013). Woodlots livelihood outcomes between men and women as it is in many farming activities differ. The difference in woodlot livelihood outcome between women and men is a hindrance of woodlot productivity and equal benefits realized from woodlots farming among women and men and affects economic development of the community and the country at large.

In Tanzania, as it is many developing countries woodlot farming has a potential of contributing to better livelihood outcomes for both men and women, as it is increasingly becoming an important economic activity ranked second after agriculture in many rural areas. According to Hudu (2009) livelihood outcomes are objectives or purposes which are sought for by individual or household in their livelihood strategies such as increase in income, increased well-being and improved food security. Livelihood strategies are ways or and means of individual or household engaging in particular economic activities, organized in a particular way to produce their livelihood outcomes or meet their needs, wants and aspirations (Hudu, 2009; Majale, 2002). In the context of this paper, woodlot livelihood outcomes refers to increase in income, increased level of asset ownership and better housing conditions.

A number of studies have used income, asset ownership and housing conditions as the immediate outcomes sought for by individual or household when deciding to engage in

particular economic or any production activities (Majale, 2002; Nathan *et al.*, 2005; Paulo, 2007). Similar outcomes as livelihood outcomes is anticipated to be driving individuals or households in pursuing woodlot farming in Mufindi district and Tanzania in general. Income, asset ownership and housing conditions as socio-economic status provides benefits to individuals and households such as improved living conditions, protection during emergencies and collateral for credits that can be used for investment or consumption (Jeckoniah *et al.*, 2013).

Several studies on woodlot farming have been conducted (Chikoko, 2002; Malimbwi *et al.*, 2010; Muningo, 2010; Singunda, 2010; Ndayambaje *et al.*, 2012; Richard *et al.*, 2014), Nevertheless, little information exists on the linkage between woodlot farming and women's and men's income, housing condition and asset acquisition and how these outcomes differ between women and men. Therefore, this paper intended to reveal how woodlots contribute to women's and men's incomes, housing condition and asset acquisition and how these livelihood outcomes differ between women and men with woodlot and those without woodlots. The finding inform policy makers, researchers and other development partners involved in planning and implementing intervention that aim in improving livelihood of women and men in woodlot farming and promoting equality between women and men in woodlot farming.

### **Methodology**

The study was conducted in Ihalimba and Mdabulo wards in Mufindi District in Iringa region. In each Ward two Villages were selected where Vikula and Nundwe Villages were selected from Ihalimba Ward while Ludilo and Ihefu Villages were selected from Mdabulo Ward. Mufindi District was selected purposively because it is leading in woodlot farming in Tanzania (MDC, 2008 ; Singunda, 2010). The paper adopted a cross-sectional

research design. The sampling unit was individual women and men with and without woodlot. Structured questionnaire and checklist for key informants were main tools used for data collection. Key informants interviewed were Agricultural Extension Officers, leaders of woodlots owners groups and Village and Ward leaders to supplement information on livelihoods outcomes from woodlot farming. Random sampling was used to select 120 respondents where 64 (53.3%) were woodlot owners where by 29 (24.0%) were women and 35 (29.3%) were men and 56 (46.7%) were non-owners whereby 29 (24.2%) were women and 27 (22.5%) were men. Descriptive statistical analysis was used to compute livelihood outcomes in woodlot farming while Wealth index was used on assessment of asset ownership among woodlot owners and non-woodlot owners. According to key informants, a wealthier household is a household having the following assets poultry, bicycle, motorbike, mobile phone, radio, Television set, land and solar panel. Therefore this study adopted these assets as indicators of wealth. Thus the asset ownership was translated to wealth. The formula was used to quantify wealth was developed by (Hortland, 1993 cited by Simon, 2005)

$$WET_i = \sum (y_{ij}/Y_{max}) \quad (i = 1, 2, \dots, x, j = 1, 2, \dots, n)$$

Where WET = wealth index

$y_{ij}$  = number of an individual asset (poultry, bicycle, motorbike, mobile, radio, Television set, land and solar panel)

$Y_{max}$  = maximum number of that asset in the sample

X = number of items considered as indicators for wealth.

n = sample size

The formula has been used to analyze asset ownership among woodlot owners and non-woodlot owners. Based on the wealth index mean, respondents were categorized into two groups. Below the mean were taken as having low wealth status, while those above the

mean were taken as having high wealth status and those with equal to the mean belong medium wealth status. Independent T-test analysis was used to compare livelihood outcomes of women and men with and without woodlots where incomes and asset values of women and men with and without woodlot were compared and chi-square was used to compare housing condition of women and men with and without woodlots.

## **Findings and Discussion**

### **Income accrued from woodlot farming**

Woodlots farming in Mufindi District have contributed substantially to individual and household income. Table 3.1 reveals that most of woodlots owners (25%) their income is between 1 000 000 and 5 000 000 TZS per annum while few woodlots owners (2.5%) their income is below 1 000 000 TZS per annum. Majority non-woodlots owners (34.2%) their income is below 1 000 000 TZS per annum. This implies that woodlots owners are getting more income compared to their counterparts' non woodlots owners. The similar trend was reported by Mgeni (2014) who found that the income of majority of woodlot owners was between 900 000 to 5 000 000 TZS per year. In key informant interview it was reported that there is a problem of farmers selling immature stand trees to middlemen who manage woodlots to maturity and then extract timber for sale to final market destinations were they get high income than farmers who are selling immature stand trees.

**Table 3.1: Income accrued from woodlot farming in percent (n=120)**

<b>Variable</b>	<b>Category</b>	<b>Woodlots ownership</b>		<b>Total</b>
		<b>Owners</b>	<b>Non woodlots</b>	
Woodlot income	1 000 000 < shillings	2.5	34.2	36.7
	1 000 000-5 000 000 shillings	25.0	7.5	32.5
	5 000 001-10 000 000 shillings	11.7	0.8	12.5
	10 000 001-150 000 000 shillings	8.3	0.0	8.3
	15 000 000 > shillings	5.8	0.0	5.8

### Means of earning woodlots income

In woodlots farming there are different ways of earning woodlot income. The results from Table 3.2 reveals that majority of woodlots owners are earning their income from sale of whole tree while small percentage of woodlots owners earn income from selling their labour. Also, most of non-woodlots owners are earning income from pit sawing and selling firewood while the small percentage are earning income from selling timber as wage worker or middle men.

**Table 3.2: Means of earning woodlot income in percent (n=120)**

Variables	Woodlot ownership		Total
	Owners	Non owners	
Sale of whole tree	100.0	0.0	100.0
Sale of timber	93.3	6.7	100.0
Sale of firewood	11.9	88.1	100.0
Pit sawyer	12.6	87.4	100.0
Food vendor	8.4	91.6	100.0
Making local brew	0.0	100.0	100.0
Laborer	9.2	90.8	100.0

### Control of income accrued from woodlot farming

The study found that men are dominating in making final decision on the use of income accrued from woodlot farming whereby about 56.7% of respondents reported that men are making final decision on use woodlot farming, 37.5% of respondents reported that both women and men make final decision on use of woodlot income and 5.8% of respondents reported that only women are involved in making final decision on use of woodlot income. This implies that men are dominating in making final decision on use of income compared to women. This may be explained by the fact that in most rural setting there is tradition that men are responsible for making final decision on use of income from any source.

### Housing conditions

The findings on housing condition are presented on Table 3.3, indicates that majority of the respondents (95%) were living in house that they owned. The differences in quality of houses were relatively high. This suggests that woodlot farming was associated with high quality of houses. Similar findings were reported by Simon (2005) who found that adopter of woodlot had better houses unlike non adopters. Also, information from key informant interview revealed that people had been using woodlot income in house construction and modification, also there have been the scenario of woodlot owners and rich people from urban centers (Mafinga, Iringa and Makambako) to exchange woodlot plot with houses.

**Table 3.3: Housing conditions of woodlot owners and non-woodlot owners in percent (n=120)**

Variable	Category	Woodlot ownership		Total
		Owners	Non owners	
House ownership	No	0.0	5.0	5.0
	Yes	53.3	41.7	95.0
Number of rooms	1 - 3 rooms	5.0	45.0	50.0
	4 - 7 rooms	44.2	1.6	45.8
	7 > rooms	4.2	0.0	4.2
Material in wall	Burnt bricks	48.3	10.8	59.2
	Un-burnt brick wall	5.0	35.0	40.0
	Muddy wall	0.0	0.8	0.8
Roofing material	Thatch grass / mud	0.0	12.5	12.5
	Corrugated iron sheets	53.3	34.2	87.5
Floor material	Ceramic tiles	0.8	0.0	0.8
	Cement	49.2	11.6	60.3
	Sand	3.3	35.0	38.0

### Asset ownership

The findings of asset ownership are presented by Wealth index. Based on the wealth index the mean was 0.0653, respondents were categorized into two groups. Those below the



mean were taken as having low wealth status, while those above the mean were taken as having high wealth status. According to Table 3.4, the mean of Wealth index for majority woodlot owners (94.4%) was above 0.0653. Therefore, woodlot owners were on average are wealthier than non-woodlot owners. This suggests that owning woodlots was associated with high wealth status. Similar finding was reported by Simon (2005) who reported that the adopters of rotation woodlot on average are wealthier than non-adopters of rotation woodlot.

**Table 3.4: Wealth Index on asset owned by woodlot owners and non-woodlot owners in percent (n=120)**

Wealth groups	Category	Woodlot ownership		Total
		Non-owners	Owners	
Low wealth status	0.0653 < Mean	79.1	20.9	100.0
High wealth status	0.0653 > Mean	5.6	94.4	100.0

#### **Income and asset value of woodlots owners and non-woodlot owners**

It was hypothesized that women and men with woodlot are more likely to have better livelihood outcomes than women and men without woodlot. The Independent T-test was used to test the hypothesis. These findings are presented in Table 3.5 and Table 3.6. The Independent T-test results showed that there are significant differences in incomes and asset values of women and men with woodlots and without woodlot as livelihood outcomes at ( $P < 0.05$ ). Thus the hypothesis that women and men with woodlot are more likely to have better livelihood outcomes than women and men without woodlot was confirmed. The findings are in line with Simon (2005) who found that woodlot adopters have higher income and asset compared to non-woodlot adopter.

**Table 3.5: T-test on income and asset value between women with woodlots and women without woodlot**

Variables	Woodlot ownership	n	Mean	F-Value	P-value
Income	Non owners	26	721 000	35.055***	0.000
	owners	28	730 000		
Poultry value	Non owners	27	46 000	2.848 <sup>ns</sup>	0.097
	owners	27	99 500		
Bicycle value	Non owners	11	107 000	4.537*	0.045
	owners	12	122 000		
Radio value	Non owners	26	32 700	14.978***	0.000
	owners	28	106 000		
Land value	Non owners	29	592 000	2.702 <sup>ns</sup>	0.106
	owners	28	1 470 000		
Mobile Value	Non owners	21	30 500	8.454**	0.006
	owners	28	601 100		

\*\*\* means significant at the 0.1% level, highest level of significance

\*\* means significant at the 1% level, intermediate level of significance

\* means significant at the 5% level, lowest level of significance

ns means not significant

**Table 3.6: T-test on income and asset value between men with woodlot and men without woodlot**

Variable	Woodlot ownership	n	Mean	F-value	P-value
Income	Non owners	25	1 060 000	24.370***	0.000
	Owners	36	6 240 000		
Poultry value	Non owners	26	4 360 000	14.357***	0.000
	Owners	36	117 000		
Bicycle value	Non owners	21	109 000	4.990**	0.031
	Owners	24	113 000		
Mobile value	Non owners	19	42 100	2.463 <sup>ns</sup>	0.122
	Owners	36	89 800		
Radio value	Non owners	24	4 400	5.516**	0.022
	Owners	36	126 000		
Land value	Non owners	26	761 000	6.704**	0.012
	Owners	36	1 240 000		

\*\*\* means significant at the 0.1% level, highest level of significance

\*\* means significant at the 1% level, intermediate level of significance

ns means not significant

### Housing conditions of woodlots owners and non-woodlot owners

The results in Table 3.7 show that there are significant differences in quality houses owned by women and men with and without woodlot, with exception of house ownership where there is no significant differences. This may be explained by facts in most rural area majority of people own houses made of cheap and locally available materials (Gonzalez, 2003). The differences are high in materials used for wall construction, floor and number of rooms at  $P < 0.001$ . This implies that majority of woodlot owners had more houses of better quality compared to their counterparts.

**Table 3.7: Housing conditions of women and men with woodlots and women and men without woodlot**

Variable	Categories	Women woodlot ownership			Men woodlot ownership		
		Owners	Non owners	p-value	owners	Non owners	p-value
House ownership	No	0.0	2.5	0.80 <sup>ns</sup>	0.0	2.5	0.40 <sup>ns</sup>
	Yes	23.3	21.7		30.0	20.0	
Material wall	Burnt brick	19.2	6.7	0.000 <sup>***</sup>	29.1	4.2	0.000 <sup>***</sup>
	Un burnt bricks	4.2	17.5		0.8	17.5	
	Muddy wall	0.0	0.0		0.0	0.8	
Material roofing	Mud	0.0	6.7	0.030 <sup>*</sup>	0.0	5.8	0.001 <sup>**</sup>
	Iron sheet	23.3	17.5		30.0	16.7	
Material floor	Tiles	0.0	0.0	0.000 <sup>***</sup>	0.8	0.0	0.000 <sup>***</sup>
	Cement	21.7	7.5		27.5	4.2	
	Sand	1.7	16.7		1.7	18.3	
Number of rooms	1-3 rooms	21.7	23.3	0.000 <sup>***</sup>	0.0	21.7	0.000 <sup>***</sup>
	4-7 rooms	16.7	0.8		27.5	0.8	
	7 > rooms	1.7	0.0		2.5	0.0	

\*\*\* means significant at the 0.1% level, highest level of significance

\*\* means significant at the 1% level, intermediate level of significance

\* means significant at the 5% level, lowest level of significance

ns means not significant

## **CONCLUSIONS AND RECOMMENDATIONS**

Woodlot farming in Mufindi District is associated with better livelihood outcomes. Woodlot farming has high input on income increase, asset ownership and housing conditions as livelihood outcomes. Furthermore, woodlot causes differences in livelihood outcome between women and men with and without woodlot whereby, women and men with woodlot had higher income, assets of higher values and houses of good quality compared to their counterparts.

Therefore, the paper recommends individuals and community to engage in woodlot farming and woodlot related activities as their major economic activities for better livelihood outcomes thus they can improve their incomes, level of asset ownership and better housing conditions. Also the government, non-governmental organisations, development programmes should promote woodlot farming through investment in woodlot farming by creating conducive environment for woodlot production. The government should provide soft loans, constructing better transportation and communication system and expertise in woodlot practices so as to make woodlot farming prosper for better livelihood outcomes.

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## **CHAPTER FOUR**

### **4.0 CONCLUSIONS AND RECOMMENDATIONS**

#### **4.1 Conclusions of Major Findings**

The following is the summary of the major findings of this study on which on the basis of these findings recommendations are made.

##### **4.1.1 Women and men roles in woodlot farming**

The first specific objective was to describe roles played by women and men roles in woodlot farming. The results revealed that men are major workforce in woodlot farming whereby men dominated in land preparation, thinning, pruning, harvesting, transportation and price negotiation activities while women dominated in seed preparation and weeding activities. Harvesting is done by men only while planting is shared by both women and men.

##### **4.1.2 Factors affecting women and men in woodlot ownership**

The second specific objective of this study was to identify factors affecting women and men in woodlot ownership. The findings show that land ownership is a major factor affecting woodlot ownership. However, timber needs affects more men than women in woodlot ownership while long distance in search for firewood affects more women than men in woodlot ownership. The results also revealed that total land acreage owned is the key predictor of woodlot ownership.

##### **4.1.3 Livelihood outcomes in woodlot farming**

The third and fourth specific objectives of this study were to analyze livelihood outcomes and compare livelihood outcomes of women and men with and without woodlot



respectively. Income, asset ownership and housing condition were used as livelihood outcomes. In general, women and men with woodlot had more income, more assets and houses of better quality compared to their counterparts' men and women without woodlot. Wealth index show that woodlot owners are wealthier than non-woodlot owners. The independent T-test on income and asset value and Chi Square on housing condition indicated significant differences at ( $P < 0.05$ ).

## **4.2 Recommendations**

On the basis of the empirical findings presented in this dissertation, the following recommendations are made.

### **4.2.1 Promoting women's involvement in woodlot farming activities**

Women are lowly involved in woodlot farming activities compared to men who are the major workforce in woodlot farming. Promoting women's involvement in woodlot farming activities will help women and men benefit equally from woodlot farming. It is recommended that individuals and the community to sensitize and promote women involvement in woodlot related activities. Also, the government and non-governmental organisations should encourage women involvement in performing woodlot farming activities through awareness creation by influential stories of successful women in woodlot farming and creating gender sensitive woodlots projects which encourage women involvement in woodlot farming.

### **4.2.2 Promoting land ownership among women and men**

Land ownership is a prerequisite for woodlot ownership. The promotion of land ownership among women and men will increase chances of woodlot ownership among women and men. Therefore individual and community should acquire land through purchasing parcels

of lands and or leasing land. The government and non-governmental organisations should promote land ownership through awareness creation by gender sensitive programmes that will help some individuals to do away with patriarchy system that might hinder women in land ownership. Also, Village Assembly and Village Council should distribute village land to villagers at reasonable cost.

#### **4.2.3 Promoting woodlot farming for better livelihood outcomes**

For better livelihood outcomes in Mufindi District, individuals and the community have to engage in woodlot farming as economic activity. Governmental and Non-governmental organisations should increase their efforts to promote woodlot farming for better livelihood outcomes. This can be done through investing in woodlot farming by creating conducive environment for woodlot farming like provisions of loans, manpower (expertise) and facilitation in construction infrastructure to ensure smooth flow of technology, services and stable marketing of woodlots products.

## APPENDICES

### Appendix 1: Questionnaire

**Title: Gendered livelihood outcomes from woodlots in Mufindi District, Tanzania: A**

#### MARD Research Questionnaire

#### Questionnaire Identification

Date of interview ..... Questionnaire No.....

District..... Ward.....

Village.....

#### Section A: Socio- Economic Characteristics of the Respondents

1. Age ..... (yrs.)
2. Sex..... 1. Male ( ) 2. Female ( )
3. Marital Status.....1. Single ( ) 2. Married ( ) 3. Divorced ( )  
4. Separated ( ) 5. Cohabiting ( ) 6. Widower ( )
4. Type of marriage..... 1. Monogamy ( ) 2. Polygamy ( )
5. Education Level.....  
1. No formal education ( ) 2. Primary ( )  
3. Secondary ( ) 4. Technical education / Diploma ( )  
5. University ( ) 6. Others (Specify).....
6. Relationship with household head  
1. Household head ( ) 2. Spouse ( ) 3. Brother / Sister ( )  
4. Own child ( ) 5. Others (specify).....
7. Occupation.....  
1. Farmer / crop producer ( ) 2. Livestock keeper ( )  
  
3. Farming & livestock keeping ( ) 4. Pet trader ( )  
  
5. Wage labourer ( ) 6. Self-employed ( ) 7. Formal / civil servant ( )  
  
8. Housewife ( ) 9. Others (specify).....

8. What are the sources of your incomes ( list the source /s)

.....  
 .....  
 .....

9. How much do you earn per month from each source?

.....Tshillings  
 .....Tshillings

10. What is the average income per month?.....Tshillings

**Section B: Factors affecting woodlots ownership**

11. Does your household own land? .....1. Yes ( ) 2. No ( )

12. If yes what is the total acreage land owned? .....(acres)

13. Do you have your own land (apart from cultivation land) which you do woodlot farming? ..... 1. Yes ( ) 2. No ( )

14. If yes what is the common name trees planted? 1. Pines ( ) 2. Eucalyptus ( ) 3. Cypress ( ) 4. Other.....

15. Indicate the size and year of establishing each of the woodlots plots?

Plot No.	Size (acres)	Year of establishment
1		
2		
3		
4		

16. How was land for the woodlots acquired? 1. Inherited ( ) 2. Purchased ( ) 3. Allocated by village government ( ) 4. Getting it as a gift ( ) 5. Lease ( )

17. What type of ownership in which the portion woodlots is held?

- 1. Individual ownership ( )
- 2. Joint (including husband and wife owners) ( )
- 3. Family ( ) 4. Other (please specify) .....

18. What do you consider to be the major reasons for you to engage in woodlot farming? 1. Adequate capital ( ) 2. Land ownership ( ) 3. Timber need ( ) 4. Poles need ( ) 5. Lack of non-farm activities ( ) 6. Long distance to search for firewood's ( ) 7. Improve land ( ) 8. Other (specify).....
19. What do you consider to be the major reasons for not engaging in woodlot farming? 1. Inadequate capital ( ) 2. Lack of enough land ( ) 3. Engaging in other non-farm activities ( ) 4. Other (specify).....
20. Does lack of capital / enough capital influence you to engage in woodlots farming or not? 1. Yes ( ) 2. No ( )
21. How far is the place where you usually get your fuel wood.....Km?
22. Do you engage in other non-farming activities? 1. Yes ( ) 2. No ( )
23. Did you grow woodlot in order to protect your land? 1. Yes ( ) No ( )
24. Are women allowed to own woodlots in your community? 1. Yes ( ) No ( )  
If No explain why.....  
.....
25. Do both women and men have the same right to access woodlots products? 1. Yes ( ) No ( )
26. If No explain why? .....
27. Which woodlots products that women mostly have access to? 1. Whole tree ( ) 2. Firewood ( ) 3. Poles ( ) 4. Timber ( ) 5. Timber bucks ( ) 6. Other (Specify).....
28. Which woodlots products men mostly have access to? 1. Whole tree ( ) 2. Firewood ( ) 3. Poles ( ) 4. Timber ( ) 5. Timber bucks ( ) 6. Other (Specify).....
29. Who have right to control over woodlots products? 1. Women ( ) 2. Men ( )  
Explain why.....  
.....  
.....

#### **Section D: Roles played by women and men in woodlot farming**

30. Do women and men perform different TZSKs in woodlots farming? .....
1. Yes ( ) 2. No

31. Who always make decision on woodlots farming daily activities?

1. Women ( ) 2. Men ( ) 3. Both women and men ( )

32. Do all activities done by women in woodlot farming given the same value as those activities done by men in your area? 1.Yes ( ) No ( )

33. How many hours do you spend in woodlots farming activities per week .....?

Woodlots farming activities	Women	Men	Both women and men	No. hrs spent per day
Nursery or seed preparation				
Land preparation				
Planting				
Thinning				
Making fire line				
Pruning				
Weeding				
Harvesting				
Transport				
Searching for market				
Price negotiation				

**Section E: Livelihood outcomes in woodlot farming**

34. Did you receive any income from woodlot farming related activities? 1. Yes ( )  
2.No ( )

35. What is the total income you receive from woodlot farming related activities per year..... Tshillings

36. How men use woodlot income.....  
.....

37. How women use woodlot income.....  
 .....
38. Who make the final decision on use of income accrued from woodlots related activities? 1. Women ( ) 2. Men ( ) 3. Both women and Men ( )
39. How do you earn income from woodlots?  
 1. Sale of poles ( ) 2. Sale of whole tree ( ) 3. Sale of timber ( )  
 4. Sale of firewood ( ) 5. Employed as labour ( ) 6. Other (specify).....
40. Which is the most profitable source of earning income from woodlot related activities..... 1. Sale of poles ( ) 2. Sale of whole tree ( ) 3. Sale of timber ( )  
 4. Sale of firewood ( ) 5. Employed as labour ( ) 6. Other (specify) .....
41. Who benefits more from woodlots income? 1. Women ( ) 2. Men ( )  
 Explain how .....
42. Does this house belong to you or your household head?  
 1. Yes ( ) 2. No ( )
43. Which type of title your house is held? .....  
 1. Owner ( ) 2. Rented ( ) 3. Family ( ) 4. Other (specify).....
44. How many rooms are used for sleeping only? .....
45. What kind of material has been used for the construction of the wall? 1. Burnt bricks ( ) 2. Un burnt brick wall ( ) 3. Corrugated iron sheets / tin ( )  
 4. Cement bricks ( ) 5. Others (specify).....
46. What kind of material is used for roofing?  
 1. Thatch grass / mud ( ) 2. Tin ( ) 3. Corrugated iron sheets ( )  
 4. Tiles 5. Others (specify) .....
47. What kind of material has been used for floor?  
 1. Wood planks / Polished wood ( ) 2. Ceramic tiles ( )  
 3. Cement ( ) 4. Others (specify) .....

48. Does your household own any of the following assets?

S/N	Assets owned	Yes	No	If Yes how many	Estimated value of asset
1	Poultry				
2	Pig				
3	Functioning bicycle				
4	Functioning motor bike				
5	Functioning phone				
6	Functional Radio				
7	Functioning Television set				
8	Cattle				
9	Goat				
10	Tea plot			..... acres	
11	Land			.....acres	
12	Woodlot plot			.....acres	
13	Others (specify).....				



**Appendix 2: Checklist for Key Informant**

1. What are the factors promoting / hindering woodlot ownership among women and men in your area.
2. What are men and women roles in woodlot farming activities?
3. Are there any changes in roles in woodlot farming among women and men?
4. Does the woodlot farming contribute to increase in income? How?
5. Does the woodlot farming contribute to increase in asset ownership? How?
6. Does the woodlot farming contribute to better housing conditions? How?
7. Is there any difference in terms of income, asset ownership and housing conditions between women and men with and women and men without woodlots?

**THANK YOU FOR YOUR COOPERATION**