

**EFFECTS OF NON-FARM ACTIVITIES ON HOUSEHOLD INCOME IN  
SELECTED RAPIDLY URBANIZING VILLAGES IN MUFINDI DISTRICT  
IN IRINGA REGION, TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF  
THEREQUIREMENTS FOR THE DEGREE OF MASTER OF  
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## ABSTRACT

Although, agriculture remains the main source of income and employment in developing countries, it is a universally accepted fact that agricultural sector is incapable of creating sufficient income in the middle of increasing population. Thus, the non-farm sector is increasingly becoming important. Generally, the study assessed the effects of non-farm activities to household income in purposefully selected rapidly urbanizing villages in Mufindi District, namely; Nyololo Shuleni, Lugema, Igowole and Kiyowela, whereby, the sample of 223 farmers was involved. The study specifically identified the non-farm activities in the study area; determined the factors that influence farmers to participate in non-farm activities in the rapidly urbanizing villages, and examined the effects of non-farm activities on income of the farmers in those villages. Descriptive statistics were used to identify non-farm activities in the study area and obtain general characteristics of the study population. Probit model was used to capture the influence of determinants of non-farm activities participation by farmers and results indicated that sex, age, and education level of farmers were statistically significant while farm size owned and farm size cultivated were not. Propensity Score Matching was used to determine the effect of non-farm activities on the income of farmers in urbanizing villages and the findings show that the difference in incomes between farmers with non-farm activities and those without was statistically significant. It can be concluded that, non-farm activities served as the potential alternative source of income to farmers which will enable them to secure more necessities for their better living. Therefore, it is recommended that, to improve household income, the government should improve the quality of education offered by introducing agricultural and entrepreneurial courses in elementary schools and make them core courses to increase awareness of importance of various activities. In addition, subsidizing agricultural inputs, but also improving infrastructure facilities such roads, will be a good move to non-farm activities in improving people's income.

## DECLARATION

I, KUBWELA RUMULIKA, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work, done within the period of registration neither been submitted nor being concurrently submitted to any other institution.

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## TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>ii</b>
<b>DECLARATION .....</b>	<b>iii</b>
<b>COPYRIGHT.....</b>	<b>iv</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>v</b>
<b>TABLE OF CONTENTS.....</b>	<b>vi</b>
<b>LIST OF TABLES .....</b>	<b>x</b>
<b>LIST OF FIGURES .....</b>	<b>xi</b>
<b>LIST OF APPENDICES.....</b>	<b>xii</b>
<b>LIST OF ABBREVIATIONS AND SYMBOLS.....</b>	<b>xiii</b>
<b>CHAPTER ONE .....</b>	<b>1</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 Background to the Problem .....	1
1.1.1 Urbanization and economic development .....	4
1.2 Problem Statement and Justification .....	5
1.3 Research Objectives .....	7
1.3.1 Overall objective .....	7
1.3.2 Specific objectives.....	7
1.4 Research Questions/ Hypotheses .....	8
1.4.1 Research questions .....	8
1.4.2 Research hypotheses.....	8
1.5 Organization of Dissertation.....	8
<b>CHAPTER TWO .....</b>	<b>9</b>
<b>2.0 LITERATURE REVIEW .....</b>	<b>9</b>
2.1 Theoretical Framework .....	9

2.1.1	Definitions and key concepts .....	9
2.1.2	Theories underpinning the study .....	9
2.1.2.1	Theory of participation (TP) .....	9
2.1.2.2	Concentric diversification theory (CDT) .....	10
2.2	Empirical Review .....	10
2.2.1	Determinants of non-farm activities participation .....	10
2.2.2	Farmers' participation in non-farm activities .....	11
2.3	The Conceptual Framework .....	13
<b>CHAPTER THREE .....</b>		<b>15</b>
<b>3.0</b>	<b>RESEARCH METHODOLOGY .....</b>	<b>15</b>
3.1	Description of the Study Area.....	15
3.2	Study Design.....	16
3.3	Sampling Unit and Sample Size.....	16
3.4	Sampling Technique and Procedure.....	17
3.5	Data Collection .....	18
3.5.1	Research tool.....	18
3.5.2	Pre-testing of the questionnaire.....	18
3.6	Data Analysis .....	18
3.6.1	Non-farm activities in the study area .....	19
3.6.2	Determinants of non-farm participation .....	19
3.6.3	Non-farm participation and overall income of farmers .....	19
3.7	Limitation of the Study.....	21
3.8	Ethical Considerations.....	22
<b>CHAPTER FOUR.....</b>		<b>23</b>
<b>4.0</b>	<b>RESULTS AND DISCUSSION .....</b>	<b>23</b>
4.1	Socio-economic Characteristics of the Respondents .....	23

4.1.1	Sex.....	23
4.1.2	Age .....	24
4.1.3	Education level.....	25
4.1.4	Land ownership.....	27
4.1.5	Non-farm participation proportion .....	27
4.1.6	Migration of respondents across district.....	28
4.2	Non-Farm Activities in the Study Area.....	29
4.3	Factors Influencing Farmers to Participate in Non-farm Activities.....	29
4.3.1	Sex of respondents .....	30
4.3.2	Age of the respondent.....	31
4.3.3	Education level of the respondent .....	31
4.3.4	Farm size owned and farm size cultivated.....	31
4.3.5	Migration .....	32
4.4	Effects of Non-Farm Activities on Farmers' Incomes .....	32
4.5	Testing of Research Hypotheses .....	33
4.6	Variations between the Four Selected Villages .....	34
4.6.1	Non-farm participation across villages.....	34
4.6.2	Education status across villages .....	35
4.6.3	Migration across villages .....	35
4.6.4	Reasons for migration.....	36
4.7	Better Living Indicators.....	37
4.7.1	Ability to afford farm inputs against non-farm participation .....	37
4.7.2	Having enough food for the family .....	38
4.8	Summary of the Results.....	38
	<b>CHAPTER FIVE .....</b>	<b>39</b>
	<b>5.0 CONCLUSION AND RECOMMENDATIONS .....</b>	<b>39</b>

5.1	Conclusion .....	39
5.2	Recommendations .....	39
	<b>REFERENCES .....</b>	<b>41</b>
	<b>APPENDICES.....</b>	<b>49</b>

## LIST OF TABLES

Table 1: Distribution of respondents by sex.....	23
Table 2: Distribution of respondents participating in non-farm activities by sex .....	24
Table 3: Distribution of respondents by age groups .....	24
Table 4: Distribution of respondents engaging in non-farm activities by age groups .....	25
Table 5: Distribution of respondents by education level .....	26
Table 6: Distribution of respondents engaging in non-farm activities by educationlevel .....	26
Table 7: Distribution of respondents by land ownership .....	27
Table 8: Distribution of respondents by farm size owned and cultivated.....	27
Table 9: Distribution of respondents by non-farm participation .....	28
Table 10: Migration .....	28
Table 11: Reason for migrating .....	29
Table 12: Non-farm activities in the study area .....	29
Table 13: Determinants of non-farm activities participation .....	30
Table 14: Effects of non-farm activities on farmers' incomes .....	33
Table 15: Non-farm participation across villages.....	34
Table 16: Education status across villages .....	35
Table 17: Migration across villages.....	36
Table 18: Reasons for migration across villages .....	37
Table 19: Distribution of respondents engaging in non-farm participation against ability to afford farm inputs.....	38
Table 20: Distribution of respondents engaging in non-farm participation against enough food availability.....	38

**LIST OF FIGURES**

Figure 1: The Conceptual Framework .....14

**LIST OF APPENDICES**

Appendix 1: Questionnaire.....49

**LIST OF ABBREVIATIONS AND SYMBOLS**

AERC	African Economic Research Consortium
AGC	International Growth Center
ASDS	Agricultural Sector Development Strategy
ATET	Average Treatment Effect on the Treated
CDT	Concentric Diversification Theory
CLAD	Censored Least Absolute Deviation
GDP	Gross Domestic Product
NBS	National Bureau of Statistics
PCT	Pyrethrum Company of Tanzania
PSM	Propensity Score Matching
SPSS	Statistical Package for Social Science
TP	Theory of Participation
TRA	Tanzania Revenue Authority
TZS	Tanzanian Shillings
URT	United Republic of Tanzania
WB	World Bank

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background to the Problem

Policy makers perceived for long time that, household income in developing countries exclusively depended on farming activities; this had made them to largely focus on the agricultural sector, and ignoring non-farm sectors (Babatunde, 2013). Despite the fact that, farm sector remains the main source of income in developing countries, production is far from being adequate (Ana and Habte, 2017). However, evidence has shown that, smallholder farmers not only depend on agriculture for their incomes but also often engaged in non-farm income generating activities such as trade, non-farm wage employment, and self-employment e.g handcraft enterprise and so on of which appear to be very important (Barrett *et al.*, 2001a). Thus, non-farm activities have become very important component of livelihood strategies to many people in the rural communities (Babatunde and Qaim, 2009a, 2009b).

Little literature available shows that non-farm activities are significant in improving the income of farmers (Babatunde *et al.*, Qaim, 2009b). Specifically, for African countries, with rapid population growth and increasingly limited agricultural resources, the potential role of the non-farm sector deserves particular consideration (Barrett *et al.*, 2001a).

Moreover, it is argued that, farmers are motivated to engage in non-farm activities by pull factors (Reardon *et al.*, 2001). For example, higher incomes from non-farm sector as compared to farm sector. Also, push factors, for instance, risky farming, land constraints, missing crop insurance, consumption and input credit markets (Reardon *et al.*, 2001) do

influence farmers to engage in non-farm activities. Other reasons for farmers to engage in non-farm sector are several; among others being access to public assets such as roads (infrastructure), and private assets such as skills trainings, education and credits (Escobal, 2001).

On the other hand, to urbanize means to build houses, hospitals, schools, offices, roads, market centers and so on in an area of countryside so that it becomes a town (Cambridge Dictionary, 2019). Therefore, it can be argued that rapidly urbanizing villages is a complex process emanating from a combination of various factors including geographical location, natural population growth, rural-urban migration, infrastructure development, national policies, corporate strategies, socio-economic forces and globalization (Hill and Linder, 2010).

Moreover, over the last two decades, rapid population growth in developing countries has resulted to economic and technological growth of villages, that is, villages are urbanizing (Barney, 2006). About 3 billion people – approximately half of the world's total population now live in urban areas. It is projected that in next 30 years, the whole world's total population will be concentrated in urban area (Barney, 2006).

Furthermore, it is projected that between 2014 and 2050, the global urban population is expected to grow by 2.5 billion people and Tanzania will be the ninth largest contributor to this increase (Mushi *et al.*, 2017). This will lead to Tanzania to be just behind the following giants like India, China, Indonesia, Nigeria, and the Democratic Republic of Congo Mushi *et al.* (2017) in terms of urbanization. However, rapidly urbanizing villages offer a unique opportunity to accelerate economic growth. That is, if managed

well, Tanzania's fast-growing cities could also drive poverty reduction strategies that lead to income improvement and enhance social inclusion.

Moreover, in Tanzania, rapidly urbanizing villages is a relatively new phenomenon (Elisa and Wietze, 2014). These villages in Tanzania have increased from 5% in 1967 to 29% in 2012 (Wenban, 2008). Thus, the government of Tanzania is facing a steep learning curve in confronting the challenges associated with the transition of rapidly urbanizing villages such as congestion of social services like in health centers and schools, and increase in crimes rates (Elisa and Wietze, 2014). Moreover, there are positive issues associated with rapidly urbanizing villages in developing countries such as social and economic growth (Mkalawa and Haixiao, 2014).

Therefore, in order to cope with rapid urbanization rate, several steps here been taken by the Tanzanian government. For example, Mushi *et al.* (2017) claims that Government of Tanzania in partnership with other public, private and civil society actors can shape the rapidly urbanizing villages transition to a more inclusive, sustainable urban development pathway through;

- Establishing enabling policy frameworks at the national, regional, and district level;
- Fostering the development of accountable and transparent institutions;
- Facilitating effective and inclusive land use planning;
- Mobilizing the financial resources needed to crowd in funding for core urban infrastructure; and
- Empowering village governments, businesses, and civil society with the information, resources, and capacities to proactively plan for and invest in better urban development.

These frameworks should plan and prioritize primary education, water supply, sewerage, local health services, and local roads and other infrastructure investments needs despite the limited resource envelope, to control rapid rate of urbanization.

### **1.1.1 Urbanization and economic development**

Urbanization is largely the result of population migrating in large numbers to the towns especially after making them the regional or district capitals, for instance, establishment of two new regions of Njombe and Sogwe resulted into influx of people seeking for jobs and resindenting opportunities (Lawi, 2013).

Further, Mushi *et al.* (2017) argue that, there is a positive relationship between rapidly urbanizing villages and GDP per Capita (or income). The benefits of urbanizing could include more varied and better employment opportunities with higher productivity, better housing and basic services, a wider choice of goods and other services and generally a better standard of living (World Bank, 2009). However, there can also be associated costs such as congestion, overcrowding, lack of adequate resources to provide basic services, land fragmentation, health hazards and costs from exposure to high levels of air and water pollution, traffic accidents, time lost to long commutes and crimes (Spring, 2002; Davis, 2007).

In addition, Gwaleba (2018) argue that the following are challenges and opportunities in rapidly urbanizing villages. To start with challenges among others:

- Traffic congestion following lack of road infrastructure and thus people spend longer time on travel;

- Increase in urban poverty and unemployment. It is particularly concentrated in social groups and location. No regular wages and most people get their incomes from casual jobs;
- Lack of access to safe water. Industrial and commercial demand for water competes with home use;
- Lack of sanitation facilities such as drainage, sewage systems and waste collection points in settlements have led to dumping of wastes in rivers and in open space; and
- Lack of access to health and education services. Given the fact that, the majority of urban dwellers are poor and depend on government-financed services at very low costs.

But also, opportunities in rapidly urbanizing villages are:

- Better access to basic services such as health care, better earnings, education and good transportation system compared to rural areas, and
- As industries and firm develop, people move to urban to work in industries. This increases economic development for individual.

## **1.2 Problem Statement and Justification**

Despite the fact that, agricultural sector remains the main source of income in the developing countries, production is far from being adequate (Ana and Habte, 2017). Agricultural policy reforms in Tanzania aiming at improving farmers' income have been practiced for decades. However, despite all the efforts there was a low increase in average income of 1% annually from 2008 to 2015, and 80% of farmers still remained below the global poverty line of 1.90 USD per day<sup>1</sup>(Babatunde and Qaim, 2009a;

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<sup>1</sup>1 USD = 2 137 TZS; 2015 Exchange Rate, (WB, 2017; URT, 2015).

Lanjouw *et al.*, 2001). That means, farmers' ability to secure necessities of life has been low.

Among agricultural policies developed and implemented by the Government of Tanzania (GoT) for transforming agricultural sector from subsistence to commercial in order to improve farmers' income; were Agricultural Policy of 1961 to 1967, Arusha Declaration – 1967, Agricultural Sector Development Strategy(ASDS) – 2001 and Agriculture First (Kilimo Kwanza) – 2007, (Coulson, 2007). Unfortunately, the government's budgetary allocation in agricultural sector had been decreasing continuously (URT, 2017). For example, agricultural sector budget fell from 926 Billion TZS in 2011/2012 to 113 Billion TZS in 2016/2017 (URT, 2017). This had reduced the quantity of subsidized farm inputs, frequency of agricultural extension officers' visits who could help farmers to make right decisions and ensuring that appropriate knowledge is implemented to obtain the best results.

Therefore, some policy makers suggest non-farm activities as another principal source income for farmers in Tanzania (Haggblade *et al.*, 2010; URT, 2014a; Chinwe, 2015). Hence, employment in non-farm activities is essential for diversification of the sources of farmers' income (Ana and Habte, 2017).

Non-farm sector is potential to diversify farmers' income. In 2008/2009 season, around 55% of farmers earned non-farm incomes, and between 2010/2011 to 2012/2013 seasons, around 65% of farmers earned non-farm incomes (URT, 2014b). Factors motivating non-farm participation are: rapidly increasing population growth rate of 2.7% in Tanzania (NBS, 2012). Other factors include increased pressure on arable lands, for instance, converting agricultural land into residential plots; frequent price fluctuations of

agricultural products (Oseni and Winters, 2009) and expected higher incomes earned from non-farm sector (Chinwe, 2015; Babatunde *et al.*, 2009b).

Iringa region has been identified as one of the urbanizing regions in Tanzania (Kasumuni, 2016). Over the interval of 10 years its regional GDP at current market prices had increased more than four times. That is, 1 038 505 Million TZS in 2005; 2 310 923 Million TZS in 2010 and 4 816 738 Million TZS in 2015 (URT, 2013a).

Therefore, the aim of this study is to identify the non-farm activities in the study area, identify the determinants for non-farm activities participation and assess effects of non-farm activities on farmers' incomes in the selected rapidly urbanizing villages in Mufindi district in Iringa region, Tanzania.

### **1.3 Research Objectives**

#### **1.3.1 Overall objective**

The overall objective of this study was to assess the effects of non-farm activities to farmers' income in rapidly urbanizing villages in Mufindi district, in Iringa region, Tanzania

#### **1.3.2 Specific objectives**

The specific objectives of this study were:

- i. To identify the non-farm activities in selected rapidly urbanizing villages;
- ii. To determine socio-economic factors that influence farmers to participate in non-farm activities in selected rapidly urbanizing villages, and
- iii. To examine the effects of non-farm activities participation on household income in selected rapidly urbanizing villages in Mufindi district in Iringa Region.

## **1.4 Research Questions/ Hypotheses**

### **1.4.1 Research questions**

- i. What are the non-farm activities in the selected rapidly urbanizing villages?
- ii. What are socio-economic factors of farmers that influence their decision to participate in non-farm activities in rapidly urbanizing villages?
- iii. What are the effects of non-farm participation on household incomes of farmers in rapidly urbanizing villages?

### **1.4.2 Research hypotheses**

- i. Socio-economic factors of farmers do not influence their decision to participate in non-farm activities in rapidly urbanizing villages.
- ii. Non-farm participation does not affect household incomes in rapidly urbanizing villages.

## **1.5 Organization of Dissertation**

This dissertation compares two groups of farmers; that is, farmers with non-farm activities with farmers without. The organization of this dissertation is as follows.

Chapter one introduces background to the problem, problem statement and justification. Furthermore, provides research objectives, research questions/ hypotheses and organization of the dissertation. Chapter two provides literature review on effects of non-farm activities on farmers' income and gives the conceptual framework which shows the relationship between variables. Chapter three covers research methodology on data manipulation. Chapter four presents the results and discussion in relation to other studies. Chapter five provides conclusion and recommendations basing on the findings of each specific research objective.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Theoretical Framework

##### 2.1.1 Definitions and key concepts

**Farm income:** This is income generated from farming activities from one's own farm, whether on owner's occupied land or leased. To define broadly, farm income includes crop output as well as the cash income generated from the sale of outputs and one's own livestock consumption (Ellis, 1998; 2000).

**Non-farm income:** Non-farm income from non-farm activities, that is, those outside of own-farming and farm wage employment (Escobal, 2001). It refers to income generated from non-farm activities which considers all economic activities other than the production of primary agricultural commodities. It includes mining, manufacturing, utilities, construction, commerce, transport, business, employment and a full range of financial, personal (for example remittance) and government services, (Barrett *et al.*, 2001a; Davis *et al.*, 2003).

**Household income:** A total income from all people living under one roof. Furthermore, the members of household are related by blood or law, they constitute a family (Business Dictionary, 2019).

##### 2.1.2 Theories underpinning the study

###### 2.1.2.1 Theory of participation (TP)

Theory of participation explains the variation in outcomes from different types of engagements (Reed *et al.*, 2017): (1) a number of socio-economic, cultural and

institutional contextual factors influence the outcomes of engagement; (2) there are a number of process design factors that can increase the likelihood engagement leads to desired outcomes; (3) the effectiveness of engagement is significantly influenced by power dynamics and (4) engagement processes work differently and can lead to different outcomes when they operate over different spatial and temporal scales. This study identifies the socio-economic factors which influence farmers to participate (engage) in non-farm activities but also the likelihood of non-farm engagement to contribute to household income.

#### **2.1.2.2 Concentric diversification theory (CDT)**

Concentric diversification theory best backs this study by entailing that; firms offer multiple related products for three major reasons (pre-determined goals). First, to provide varieties to their consumers; second, to capture maximum market share; and third, to build competitive pressure (Khan, 2012). This theory backs the fact that farmers need multiple sources of income as a way of diversifying risk so that if one source collapses, other sources can also contribute to their income. These are key themes of discussion in this study. For instance a farmer can undertake farm activities but also engage in non-farm wage or self-employment job. Non-farm activities lead to diversified income among farmers (Drejer and Gudmundsson, 2002; Ghazi and Esmaeil, 2015).

## **2.2 Empirical Review**

### **2.2.1 Determinants of non-farm activities participation**

Seng (2015); Akaakohol and Aye (2014) conducted the study on non-farm participation and employed probit models whereby their results show that education level and age of farmers are significantly positive determinants for non-farm participation. That is, well educated farmers are innovative and entrepreneurial while as farmers grow old

their experiences increase which increase non-farm opportunities but gradually lose the opportunities Seng (2015).

Babatunde and Qaim (2009b) used probit models in their studies on factors influencing non-farm engagement and their findings identified the age and level of education of the farmers as significant determinants of non-farm participation. Farm size did not show a significant effect in any of the models. This confirmed that participation in non-farm activities was not primarily a response to land constraints. In addition, infrastructural variables such as roads were significant determinants for farmers to engage in non-farm activities. Sex had differential impact on non-farm participation of farmers that male farmers engaged more in non-farm activities than female farmers Babatunde and Qaim (2009b).

Escobal (2001) and Ellis (1998) employed probit models to identify the determinants of farmers engaging in non-farm activities. Risks such as price fluctuation of agricultural products, unreliable rainfall reasons, and lack of credit markets were found to be significant. Education level of farmers was found to be insignificant.

### **2.2.2 Farmers' participation in non-farm activities**

Dominance of traditional agriculture characterized by very poor tools and farming practices led to sharply drop of farmers' incomes in developing countries (Chinwe, 2015). Moreover, the rapidly increasing population in developing countries, more pressure is exerted on arable lands. For this reason, many farmers are no longer able to depend on agricultural production only but also need to engage in non-farm income generating activities (Oseni and Winters, 2009).

Participation in non-farm activities is one of the strategies among poor farmers in many developing countries (Ana and Habte, 2017) to diversify their income sources.

Senadza (2011) used Propensity Score Matching (PSM) in his study ‘Non-farm income diversification in rural Ghana: Determinants and Implications for Income Distribution and Welfare’, and the results indicated that participation in non-farm work has significant positive effect on farmers’ income. Furthermore, Senadza (2011) claims that, there was an increase in non-farm income as a share of total farmers’ income in rural Ghana from 35% in 1998 to 41% in 2006.

Chinwe (2015) deployed Box Plot to assess the impact of non-farm participation on the overall income of the farmers in Umuawa, Abia State, Nigeria. Non-parametric test was used to determine the difference between the overall incomes of the two groups. Farmers participated in non-farm income-generating activities, especially in higher return non-farm employment, enjoyed higher levels of incomes and food than those who did not participate in such activities.

Lanjouw *et al.* (2001) conducted empirical study based on the 1998 Tanzania Peri-Urban Survey of 600 households from Dar es Salaam, Lindi, Mbeya, Mwanza, Arusha and Moshi. A Censored Least Absolute Deviation Model (CLAD) was employed and found that, non-farm activities contributed 30% of overall incomes of farmers.

Osarfo *et al.* (2016) employed Propensity Score Matching (PSM) in their study ‘The Impact of Nonfarm Activities on Rural Farm Household Income and Food Security in the Upper East and Upper West Regions of Ghana’ and results indicated that participation in non-farm work had significant positive effect on farmers’ income.

Therefore, engaging into the non-farm sector improves livelihood of farmers in terms of increasing food production and easing capital constraints by contributing to higher agricultural input use by relaxing liquidity constraints (Reardon *et al.*, 1992). For instance, Oseni and Winters (2009) argues that non-farm activities in Nigeria help farmers to improve their farm production through higher input use, including tractors, more employment of hired labour and improved seeds. An expected direct effect is that non-farm income contributes to overall farmers' income such that food becomes more accessible.

Moreover, Reardon *et al.* (2001) argue that on average, non-farm income share is 42% in Africa, followed by 40% in Latin America, and 32% in Asia. Non-farm earnings account for 35% to 50% of rural farmers across the developing countries (Haggblade *et al.*, 2010). Hence, cash income earned from non-farm activities can be used to purchase farm inputs and hire labour for agricultural production (Hert, 2009).

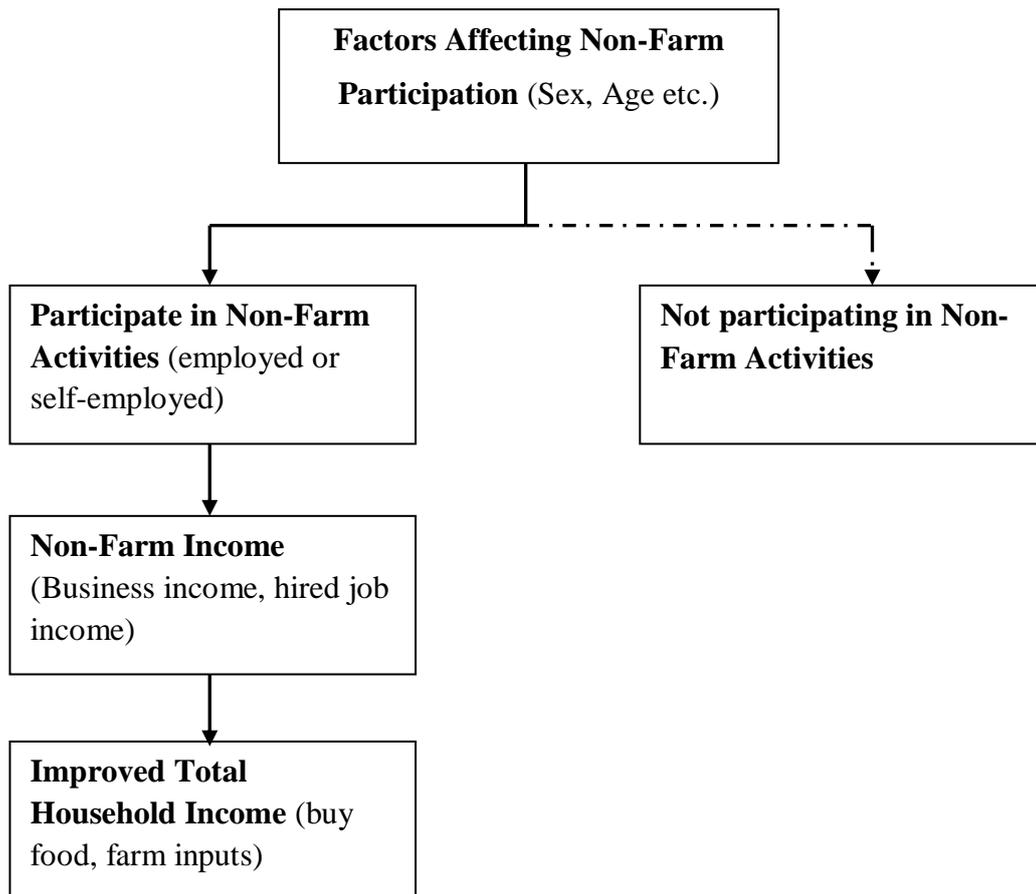
### **2.3 The Conceptual Framework**

The conceptual framework proposed in this study is presented in Figure 1. The variables in the framework are grouped in two major blocks as follows: -

- (i) Background and Independent variables which included age, sex, education, farm size owned(or cultivated),
- (ii) Non-farm activities participation, and
- (iii) Household income.

The conceptual framework shows the relationship between various variables that affect non-farm activities participation, and finally effects of non-farm activities on household income.

Decision of farmers to participate or not in non-farm activities is influenced by factors such as age of the farmer, education of the farmer, sex of the farmer. If the farmer decides to participate in non-farm activities then, he/she will earn non-farm income. Furthermore, non-farm incomes earned contribute to the total household income. This enables farmers to purchase food, farm inputs and other household requirements.



**Figure 1: The Conceptual Framework**

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

This chapter describes the study area, study design, sampling unit, sample size; sampling techniques and data collection procedures.

#### **3.1 Description of the Study Area**

Mufindi District is one of the five districts of Iringa region of Tanzania. It is bordered to the North by Kilolo and Iringa Urban districts. To the South it is bordered by the Njombe region, to the East by Morogoro region and to the West by Singida Region. As of 2012 population census, Mufindi district has a population of 265,829 (URT, 2013). It has an area of 7 515 squared kilometers. Mufindi is mountainous, with one of the coolest and rainiest climates in Tanzania. Among many, the district is known for its tea and timber industries.

Mufindi district had experienced an increasing per capita GDP from 1 206 917 TZS in 2008 to 1 652 411 TZS in 2012 (URT, 2013b). Migrants increased from 15% in 2002 of the district total population to 31% in 2012 in search of work in tea, pyrethrum and timber industries as well as employment in the Government sector, (NBS, 2012). Such industries are Pyrethrum Company of Tanzania (PCT), Uniliver Tea Tanzania Ltd, Mufindi Tea Company and Chai Bora. Mufindi district had a chance to diversify farmers overall income by taking advantage of arising opportunities such as employments in industries, and roads construction activities which attract migrants from other districts.

Nyololo ward has an area of 412 squared kilometers. Population by the year 2012 was 11 979 and its density was about 29.05 per squared kilometer. Nyololo Shuleni village is the

ward headquarters of Nyololo ward and one of five villages. It has a mixture of Wahehe and Wabena tribes with the population of 1 485 by the year 2012 (URT, 2013). It is full up of newly erected Italian-funded structures including a new hospital.

Makungu ward has an area of 360 squared kilometers. Population by the year 2012 was 12 751 and its density was about 35.45 per squared kilometer. Lugema is one of four villages in the ward with the population of 3 050 by the year 2012 (URT, 2013).

Igowole ward has an area of 250 squared kilometers. Population by the year 2012 was 13 459 and its density was 53.83 per squared kilometer. Igowole village is one of four villages in the ward with the population of 8 176 by the year 2012 (URT, 2013).

Kiyowela ward has an area of 786 squared kilometers. Its population by the year 2012 was 7 540 and its density was 9.59 per squared kilometer. Kiyowela village is one of the four villages in the ward with the population of 757 by the year 2012 (URT, 2013).

### **3.2 Study Design**

A social survey was conducted whereby a cross sectional research design was adopted. The design enabled collection of data at one point in time. According to Bernard (1996) and Babbie (1990), this design provides useful information for simple statistical description and interpretation. It also allows determination of relationship between different variables that are focused in the study.

### **3.3 Sampling Unit and Sample Size**

Individual farmers were the ultimate unit of analysis. The total sample size was 223 respondents who were all farmers from four villages. About 56 farmers from Nyololo

Shuleni village in Nyololo ward, 50 farmers from Lugema village in Makungu ward, 66 farmers from Igowole village in Igowole ward and 51 farmers from Kiyowela village in Kiyowela ward. The sample size of 400 individual farmers was suggested by Cochran's formula of 1977 basing on the probability for participation rate (p) of 0.5; Z-value of 2.0 and acceptable margin of error of 5%. Though, related studies suggested that half of it which is 200 is sufficient for analysis. For practical reasons such as undertaking data collection during harvest period which made it hard to find farmers at their homes, farmers with non-farm activities such as shops did not want to give sales estimates as thought by the researcher, that he could be an officer from Tanzania Revenue Authority (TRA). In addition, for economic reason, remoteness between wards and villages was a problem. Therefore, the researcher managed to collect data from 223 individual farmers. The response rate was 56 %.

### **3.4 Sampling Technique and Procedure**

Purposive sampling was applied to obtain four villages namely; Nyololo Shuleni, Lugema, Igowole and Kiyowela of Mufindi District. It was important to employ purposive sampling technique so as to eliminate the possibility of ending up with the villages that had no important characteristics of urbanizing villages. For example, Nyololo Shuleni village is the ward headquarters for Nyololo Ward. A mixture of Wahehe and Wabena tribe, with newly erected Italian-funded structures including new Nyololo Shuleni hospital and primary school (URT, 2013b). They also offer employment as researcher interviewed nurses and teachers during data collection. Nyololo Shuleni has a village office whereby meetings are held, disputes are settled (Kasumuni, 2016). Roads under constructions offer temporal job opportunities like truck drivers, watchmen and help potential buyers of man-made products like baskets and mats from outside Nyololo Shuleni to come, buy and transport them (URT, 2013b). Therefore, to urbanize means to

build houses, hospitals, schools, offices, roads, market centers and so on in an area of countryside so that it become a town (Cambridge Dictionary, 2019). Rapidly urbanizing villages as a complex process is mainly a result of a combination of various factors including geographical location, natural population growth, rural-urban migration, infrastructure development, national policies, corporate strategies, socio-economic forces and globalization (Hill and Linder, 2010).

### **3.5 Data Collection**

#### **3.5.1 Research tool**

A questionnaire was designed and used to interview respondents to get primary data. The questionnaire was formulated in English and then administered in Kiswahili language for easy communication during face-to-face interviews.

#### **3.5.2 Pre-testing of the questionnaire**

A preliminary survey was done to pre-test the questionnaire and check the relevance and validity of the questions to farmers. Basically, it aimed at checking whether some farmers earn non-farm income. A sample of 35 farmers was interviewed and results showed that 20 farmers (57%) had earned non-farm income. These respondents were not later included in analysis to avoid biasness. Even their neighbors were skipped to avoid spillover effect. The testing was done in two villages namely Nyololo Shuleni and Kiyowela. Therefore, the researcher had confidence that the study would get relevant and valid data to answer the study objectives.

### **3.6 Data Analysis**

Statistical Package for Social Science (SPSS) was used to analyze the data. Under this analysis, descriptive statistics; frequencies, percentages and inferential statistics were determined.





The parameter of interest is the Average Treatment Effect on the Treated (ATET). This is the outcome gain from treatment for those who actually are selected into the treatment (Heckman, 2001).

Mathematically,

$$ATET = E \{E \{ Y_{1i} | D_i=1, p(X_i) \} - E \{ E \{ Y_{0i} | D_i=0, p(X_i) \} | D_i=1 \} \} \quad \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \quad 6$$

Before calculating the ATET, the balancing property is tested on  $p(X)$  and the matching methods are used. The test of the balancing property ensures that the distribution of the relevant characteristics is balanced between the groups of participants and non-participants in non-farm activities. This leads to impose the ‘common support,’ by considering only the individuals whose propensity score belongs to the intersection of the supports of the propensity score of treated (participants) and controls (non-participants) in the impact estimation. This study uses different matching methods (Radius and Nearest Neighbour). With Radius Matching each treated unit is matched only with the control units whose propensity score falls in a predefined neighbourhood of the propensity score of the treated unit. The Nearest Neighbour consists of taking each treated unit and searching for the control unit with the closest propensity score. Once each treated unit is matched with a control unit, the difference between the outcome of the treated units and the outcome of the matched control units is computed. The ATET of interest is then obtained by averaging these differences Becker and Ichino (2002).

### **3.7 Limitation of the Study**

Distance between wards; Nyololo to Igowole 137 km, from Igowole to Makungu 47 km, Makungu to Kiyowela 179 km was one of the challenges; it took a lot of researcher’s time to reach the wards for data collection. The responses of interviews mostly depended on individual’s memory whereby respondents rarely kept written records of their activities. There were therefore, notable difficulties for respondents to give some answers

for example on individual farmer's income. Farmers with businesses such as shops lacked confidence in giving figures of their sales as some thought that the researcher was an officer from Tanzania Revenue Authority (TRA). However, the researcher managed to access data from experienced farmers who showed a very good memory of their sales, and also spent some time to educate and persuaded those who had some doubt on the researcher's job which made the collection of reliable and valid data for the study possible.

### **3.8 Ethical Considerations**

Ethical considerations entail seeking and obtaining respondents' permission and consent to avail information prior to conducting the study. Assurance of respondents' safety by observing discretion between the interviewer and interviewees was highly considered. As far as this study was concerned, permission to interview participants, such as farmers in the respective selected wards was sought in writing by the University. The responsible authorities at district and ward levels also granted the permission to collect data. Based on ethical grounds, no informant was forced to participate, neither were any informants forced to disclose information that they did not wish to divulge. Preliminarily respondents were informed that information collected was not to be revealed to anybody or any authority except for the academic purpose only.

## CHAPTER FOUR

### 4.0 RESULTS AND DISCUSSION

This chapter presents results and discussion of the study. The results are based on the study objectives as well as socio-economic characteristics of the respondents. These characteristics included; age, sex, education level, land ownership, farm size owned, farm size cultivated, migration rate and reasons for migrating. But also include non-farm participation, non-farm income and better living indicators: food availability and farmers' ability to afford better farm inputs.

#### 4.1 Socio-economic Characteristics of the Respondents

##### 4.1.1 Sex

Since the study was focusing on individual farmers as respondents, male were 54% and 46% were female (Table 1).

**Table 1: Distribution of respondents by sex**

Sex	Number (N)	Percent
Female	102	46
Male	121	54
<b>Total</b>	<b>223</b>	<b>100</b>

It is not surprising for African societies following discriminatory social attitudes which reduces workforce by denying women from engaging in income generating activities (Emma, 2017). A man is often the head of a household. He earns the majority of money, and makes the final decisions on issues of importance. Women bear children, grow food, carry water and considered subservient to their husbands. Many of these traditions are beginning to diminish as urbanization and westernization becomes more prevalent

(Emma, 2017). The findings of this study show that, women also had roles outside home. For example, some were employed as nurses, teachers and some were baskets and mats handcrafters. Furthermore, the findings of this study support Emma (2017) by showing that about 27 female farmers equivalent to 26% out of 102 engaged in non-farm activities while male farmers were 89 equivalents to 74% out of 121 as shown in Table 2.

**Table 2: Distribution of respondents participating in non-farm activities by sex**

Non-farm participation	Sex		Total N
	Female	Male	
No (% within sex)	75 (74%)	32 (26%)	107 (48%)
Yes (% within sex)	27 (26%)	89 (74%)	116 (52%)
<b>Total (% within sex)</b>	<b>102 (100%)</b>	<b>121 (100%)</b>	<b>223 (100%)</b>

#### 4.1.2 Age

The results as presented in Table 3, the ages are grouped '18-35'; '36-55'; and, 'Above 55'. The 'Above 55' age group consisted of the majority of the respondents that is, 97 equivalents to 44%. Researcher observed that, this age group was easily found at home. They worked and possessed income generating things like cows, but also had support from their grown up children. Therefore, they did not bother toiling. The '36-55' age group were 77 respondents equivalent to 34%. While the '18-35' age group had the fewest respondents that is, 49 equivalents to 22%.

**Table 3: Distribution of respondents by age groups**

Age Groups(years)	Number (N)	Percent (%)
18 to 35	49	22
36 to 55	77	34
Above 55	97	44
<b>Total</b>	<b>223</b>	<b>100</b>

As shown in Table 4, the findings show that, the “36-55” age group had the majority of the respondents who engaged in non-farm activities, that is, 66 farmers equivalents to 85% out of 78 farmers. Members of “36-55” age group participated more in non-farm activities than other two age groups. They had experience and knew the importance of multiple sources of income. But also, they had dependents who cannot generate income and some where just students. Therefore, they had to participate in non-farm activities to earn more to be able to provide for their children. Also ‘Above 55’ age group had 11 farmers equivalents to 10% out of 97 farmers who participated in non-farm activities. They had few dependants but also got support from their grownup children. The ‘18-35’ age group had 40 farmers equivalents to 82% out of 49 farmers who engaged in non-farm activities. Some also had dependants but they were less experienced than farmers of “36-55” age group. It is supported by Sienso *et al.* (2015) whose results show that, age is significant at 1% and the negative sign means that, as a person is growing his/her ability to participate in non-farm activities increase but eventually at a certain age the ability start falling despite greater experience. This could be attributed to the fact that, they are more adventurous and more susceptible to change and try new things, indicating that non-farm activities have bright future.

**Table 4: Distribution of respondents engaging in non-farm activities by age groups**

Non-farm participation	Age of the respondent			Total N
	18 to 35	36 to 55	>55	
No (% within age)	9 (18%)	12 (15%)	86 (90%)	107 (48%)
Yes (% within age)	40 (82%)	66 (85%)	11 (10%)	116 (52%)
<b>Total (% within age)</b>	<b>49(100%)</b>	<b>78 (100%)</b>	<b>97 (100)</b>	<b>223 (100%)</b>

#### 4.1.3 Education level

Results as presented in Table 5 show that most of the interviewed respondents (53%) attained primary school education. About 40% of the interviewed respondents were

illiterate. This means that, there is need to motivate and encourage people to enroll in schools to get even that basic education. The 6% attained secondary education. This indicates that generally, majority of the farmers in the study area had low level of education and less than 1% attained either vocational education or university education.

**Table 5: Distribution of respondents by education level**

<b>Education Level</b>	<b>Number (N)</b>	<b>Percent (%)</b>
None	90	40
Primary	119	53
Secondary	12	6
University	1	<1
Vocational	1	<1
<b>Total</b>	<b>223</b>	<b>100</b>

Results as shown in Table 6 suggest that, farmers who had education understood the potentiality of non-farm activities easier than farmers who had none. About 92 farmers equivalent to 78% out of 119 farmers who attained primary education, participated in non-farm activities. Sienso *et al.* (2015) shows that, level of education of respondent is positive and significant. That is, farmers who are relatively educated have greater probability of participating in non-farm activities.

**Table 6: Distribution of respondents engaging in non-farm activities by education level**

<b>Non-farm participation</b>	<b>Education level (EL) of the respondent</b>					<b>Total</b>
	<b>None</b>	<b>Primary</b>	<b>Secondary</b>	<b>University</b>	<b>Vocation</b>	
No (% EL)	80 (88%)	27(22%)	0 (0%)	0 (0%)	0 (0%)	107 (48%)
Yes (% EL)	10 (12%)	92 (78%)	12 (100%)	1 (100%)	1 (100%)	116 (52%)
<b>Total (% EL)</b>	<b>90 (100%)</b>	<b>119(100%)</b>	<b>12 (100%)</b>	<b>1 (100%)</b>	<b>1 (100%)</b>	<b>223 (100%)</b>

#### 4.1.4 Land ownership

Results in Table 7 shows that 215 farmers equivalent to 96% out of 223 farmers owned a certain amount of piece of land and 8 farmers equivalent to 4% out of 223 farmers owned zero amount of piece of land.

**Table 7: Distribution of respondents by land ownership**

<b>Own Land</b>	<b>Number (N)</b>	<b>Percent (%)</b>
No	8	4
Yes	215	96
<b>Total</b>	<b>223</b>	<b>100</b>

The average farm size owned was 4.48 acres and average farm size cultivated was 1.88 acre as indicated in Table 8. This means, there is idle land. The researcher suggests that, farmers can earn more farm income by expanding their farming production level, renting to others who do not possess any piece of land or use extra land for non-farm activities.

**Table 8: Distribution of respondents by farm size owned and cultivated**

<b>Farm size (Acre)</b>	<b>N</b>	<b>Sum (Acre)</b>	<b>Mean (Acre)</b>
Owned	215	998	4.48
Cultivated	223	418	1.88

#### 4.1.5 Non-farm participation proportion

Table 9 shows that 116 farmers out of 223 farmers, that is, about 52% of farmers participated in non-farm activities. This proves that non-farm activities are significant in improving the income of farmers and thus are motivated to participate (Babatunde and Qaim, 2009b).

**Table 9: Distribution of respondents by non-farm participation**

<b>Non-Farm Participation</b>	<b>Number (N)</b>	<b>Percent (%)</b>
No	107	48
Yes	116	52
<b>Total</b>	<b>223</b>	<b>100</b>

#### 4.1.6 Migration of respondents across district

It was reported that 15% of total Mufindi district population were migrants by 2012 (NBS, 2012). Results in Table 10 shows that, 70 farmers out of 223 farmers which is equivalent to 31% migrated from outside the selected villages.

**Table 10: Migration**

<b>Resident by Birth</b>	<b>Number (N)</b>	<b>Percent (%)</b>
No	70	31
Yes	153	69
<b>Total</b>	<b>223</b>	<b>100.0</b>

The study also needed to find out the reasons for migration. The following were mentioned; shift of parents to selected villages, availability of non-farm opportunities in selected villages and marriage, that is, after marriage couples can decide to move to other villages in search of green pastures.

Results in Table 11 shows that, 40 farmers of out 70 farmers which is equivalent to 56% who are migrants to selected villages were after non-farm opportunities. 17 farmers out of 70 farmers which is equivalent to 25% were due to shift of parents and 13 farmers out of 70 farmers which is equivalent to 19% were after marriage. Lawi (2013) argued that presence of non-farm opportunities will attract large number of people to migrate in. This has been commended to cause villages to rapidly urbanize (Hill and Linder, 2010).

**Table 11: Reason for migrating**

<b>Reason for Migrating</b>	<b>Number (N)</b>	<b>Percent (%)</b>
Parents	17	25
Non-farm opportunities	40	56
Marriage	13	19
<b>Total</b>	<b>70</b>	<b>100</b>

#### 4.2 Non-Farm Activities in the Study Area

The researcher used a table to identify non-farm activities in the study area in two categories as seen in Table 12. That is, wage employment activities whereby a farmer was hired and get paid in piece rate or regular basis such as monthly salary and self-employment activities where a farmer owned the activities and the generated income was his or hers. Furthermore, Barrett *et al.* (2001a) argued that, smallholder farmers not only depend on agriculture for their livelihood but often engaged in non-farm income generating activities such as trade, non-farm wage employment, and self-employment e.g handcraft enterprise and so on of which appear to be very important.

**Table 12: Non-farm activities in the study area**

<b>Wage employment activities</b>	<b>N</b>	<b>Self-employment activities</b>	<b>N</b>	<b>Total</b>
Teachers	7	Shops	32	
Drivers	18	Mats crafters	14	
Nurses	6	Iron welders	9	
		Masons	17	
		Others	13	
<b>Total</b>	<b>31</b>		<b>85</b>	<b>116</b>

#### 4.3 Factors Influencing Farmers to Participate in Non-farm Activities

Probit model as presented results in Table 13 shows that variables sex, age, education level and migration were all statistically significant at 1%. They affect the decision of

farmers to participate in non-farm activities. Variables farm size owned and farm size cultivated were statistically insignificant.

**Table 13: Determinants of non-farm activities participation**

Variable	Coef.	Robust std. Err.	Z	P>Z	Marginal effects
Sex	1.225478***	0.27803	4.41	0.00013	0.4567025
Age	-1.1036***	0.21972	-5.02	0.00002	-0.4332708
Education Level	1.910883***	0.30638	6.24	0.00021	0.750209
Migrants	1.1002***	0.33102	5.11	0.00011	0.511042
Farm Size Owned	0.00765	0.00873	0.88	0.381	0.0030021
Farm Size Cultivated	-0.0091	0.13167	-0.07	0.945	-0.0035688
Constant	-1.2715	0.65978	-1.93	0.054	
N					223
Wald chi2(5)					62.98
Prob> chi2					0
Log likelihood					-57.796316
Pseudo R <sup>2</sup>					0.6256

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01 are significance levels at 10%, 5%, and 1% respectively.

#### 4.3.1 Sex of respondents

The findings of the study revealed that sex of the respondent is statistically significant at 1%. The marginal effect of 0.45 suggests that, a male farmer has more probability of participating in non-farm activities by 0.45 or 45% than a female farmer. Babatunde and Qaim (2009a) used probit models in their study and reported that, sex had differential impact on non-farm participation between farmers, whereby male farmers engaged more in non-farm activities than female farmers. Traditionally, in African countries, gender roles are discriminatory where men are more assigned with income generating activities than women (Emma, 2017).

#### **4.3.2 Age of the respondent**

The results of this study showed that age is statistically significant at 1%. That is, initially as farmers age increased, his/her experience and ability in terms of body energy to participate in non-farm activities increased. At a certain age, despite the fact that farmers' experience had increased but their body strength decreased. The marginal effect of -0.43 suggests that, as a farmer was getting older and older, initially the probability of engaging in non-farm activities increase. But after a certain age their probability of participating in non-farm activities is falling by 0.43 or 43%. Therefore, it's a common thing that after a certain age, human beings' body fitness and energy decrease and needs more time to rest. Seng (2015); Akaakohol and Aye (2014) had same results in their studies regarding age as one of the variables of farmers which influence non-farm participation.

#### **4.3.3 Education level of the respondent**

Results show that, education level was statistically significant at 1%. Marginal effect of 0.75 suggests that, the probability of educated farmers to participate in non-farm activities is 0.75 more than farmers who are not educated. Similar results were reported in works of Seng (2015); Akaakohol and Aye (2014); Babatunde and Qaim (2009a) that better educated farmers were innovative and entrepreneurial, hence knew the potentiality of non-farm sector and engaged. Contrary, Escobal (2001) and Ellis (1998) used probit models to identify the determinants of non-farm participation and reported that education level of farmers had no influence on farmers' decision on whether or not to engage in non-farm activities.

#### **4.3.4 Farm size owned and farm size cultivated**

In this study, variables farm size cultivated and farm size owned were found to be statistically insignificant. Contrary to Reardon (2001), whose findings showed that the

variables were statistically significant. It assumed that, a small farm size owned and cultivated is related to poor farmers and vice versa. Therefore, non-farm participation is likely to favour farmers with larger farms.

#### **4.3.5 Migration**

The findings of this study show that, variable migration was found to be statistically significant. Lawi (2013) claims that, influx of large number of people leads to reduction of arable land, therefore, motivates people to engage in non-farm activities but also increases number of consumers, thus market demand which is essential for businesses.

#### **4.4 Effects of Non-Farm Activities on Farmers' Incomes**

Propensity Score Matching (PSM) results as presented in Table 14 shows that, both matching algorithms used: *nearest neighbor* and *radius* showed the statistically significant difference of incomes of farmers who participated in non-farm activities against farmers who did not at 5% level of significance. Nearest neighbor shows that, farmers who participated in non-farm activities earned more than farmers who did not participate in non-farm activities by an average income of 2 350 006 TZS. Radius shows that, farmers who participated in non-farm activities earned more than farmers who did not participate in non-farm activities by an average income of 3 520 006 TZS. There are several studies such as Senadza (2011); Chinwe (2015); Lanjouw *et al.* (2001) and Osarfo *et al.* (2016) argued that farmers engaged in non-farm activities earned more income than farmers who did not participate in non-farm activities.

Reardon *et al.* (2001) argued that in Nigeria, farmers who earned non-farm income used large part of it to improve the agricultural sector by being able to employ better farm inputs such fertilizers, improved seeds, tractors and so on. This led to gradual increase in

farm income, nutritious food availability. Contrary other studies such as Kilic *et al.* (2009) found that rural farmers in Albania tend to use their non-farm earnings to move out of agriculture. This is the case for many developing countries which mainly depend on agricultural sector as the agricultural employment rate falls gradually.

**Table 14: Effects of non-farm activities on farmers' incomes**

<b>Outcome variable</b>	<b>Matching algorithm</b>	<b>Treated</b>	<b>Control</b>	<b>ATET</b>	<b>Std. Err</b>	<b>T</b>
Income	Nearest Neighbor	116	23	2350006	1090006	2.152
	Radius	116	82	3520006	6670005	5.274

#### 4.5 Testing of Research Hypotheses

The study had two specific research hypotheses to be tested.

First; socio-economic factors do not influence farmers to participate in non-farm activities in rapidly urbanizing villages.

To capture the influence of socio-economic characteristics on farmers' decision to participate in non-farm activities, a probit model was employed. The variables sex, age, level of education of respondents and migration were significant at 1% level of significance.

Second; non-farm activities do not affect household incomes in urbanizing villages.

Propensity Score Matching (PSM) was used to compare the average income of households with non-farm activities from households without. The difference of incomes between two groups was found to be significant at 5% level of significance. That is, the farmers with non-farm activities are better off than farmers without non-farm activities.

#### 4.6 Variations between the Four Selected Villages

The selected villages are rapidly urbanizing and it can be shown by non-farm participation, status of education as well as migration. A briefly analysis and discussion is here.

##### 4.6.1 Non-farm participation across villages

Table 15 results show that, among 116 farmers who participated in non-farm activities, 37farmers equivalents to 32% are from Igowole, 29 farmers equivalents to 24% from Kiyowela, and finally Nyololo and Lugema each had 25 farmers equivalents to 22%. Findings show both male farmers and female farmers are engaging in non-farm activities. This indicates that, African discriminatory traditions are now diminishing as reported by Hill and Linder (2010).

**Table 15: Non-farm participation across villages**

Village	Non-Farm Participation (NFP)		Total
	No	Yes	
Nyololo	30	25	56
	% within NFP	28%	22%
Kiyowela	23	29	51
	% within NFP	22%	24%
Igowole	29	37	66
	% within NFP	27%	32%
Lugema	25	25	50
	% within NFP	23%	22%
Total	107	116	223
	% within NFP	100%	100%

#### 4.6.2 Education status across villages

Table 16 shows that, among 119 farmers who received primary education, 37 farmers equivalents to 31% are from Nyololo village. Then 33 farmers equivalents to 28% are from Igowole, 25 farmers equivalents to 21% are from Kiyowela and 24 farmers equivalents to 20% are from Lugema.

**Table 16: Education status across villages**

Village	Education level (EL)					Total
	None	Primary	Secondary	University	Vocation	
Nyololo	19	37	0	0	0	56
% within EL	21%	31%	0%	0%	0.0%	25%
Kiyowela	18	25	6	1	1	51
% within EL	20%	21%	50%	100%	100.0%	23%
Igowole	32	33	1	0	0	66
% within EL	36%	28%	8%	0%	0.0%	30%
Lugema	21	24	5	0	0	50
% within EL	23%	20%	42%	0%	0.0%	22%
Total	90	119	12	1	1	223
% within EL	100%	100%	100%	100%	100%	100%

#### 4.6.3 Migration across villages

If farmers migrated to the selected villages, then they are not residents by birth. Table 17 results show that, 70 farmers were migrants. 20 farmers equivalents to 28% were migrants in Igowole village. 17 farmers equivalents to 25% were migrants in Nyololo and Kiyowela villages. Finally, Lugema had 16 farmers equivalents to 22% who were migrants. One feature for rapidly urbanizing villages is rural-urban migration (Lawi, 2013). Therefore, presence of migrants in each selected village indicates the villages are rapidly urbanizing.

**Table 17: Migration across villages**

Village		Residents by birth (RB)		Total
		No	Yes	
Nyololo		17	37	56
	% within RB	25%	25%	25%
Kiyowela		17	34	51
	% within RB	25%	22%	23%
Igowole		20	48	66
	% within RB	28%	31%	30%
Lugema		16	34	50
	% within RB	22%	22%	22%
Total		70	153	223
	% within RB	100%	100%	100%

#### 4.6.4 Reasons for migration

The findings in Table 18 show the reasons for migration across villages. There major reasons were assessed; shift of parents, non-farm opportunities and marriage. About 39 farmers migrated across four villages due to non-farm opportunities available. 14 farmers equivalent to 36% migrated to Kiyowela, 10 farmers equivalent to 26% migrated to Nyololo and same amount moved to Igowole. Finally, 5 farmers equivalent to 12% migrated to Lugema. The remaining 31 farmers migrated because of either shift of parents or marriage. The findings support the study by Lawi (2013) which argued that, migration is the result of search for jobs and residence opportunities.

**Table 18: Reasons for migration across villages**

Village		Reasons for migrating			Total
		Parents	Non-Farm Opportunities	Marriage	
Nyololo		5	10	3	18
	% within migrated	27%	26%	23%	26%
Kiyowela		3	14	1	18
	% within migrated	17%	36%	8%	26%
Igowole		4	10	5	19
	% within migrated	22%	26%	38%	27%
Lugema		6	5	4	15
	% within migrated	34%	12%	31%	21%
<b>Total</b>		<b>18</b>	<b>39</b>	<b>13</b>	<b>70</b>
	<b>% within migrated</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

#### 4.7 Better Living Indicators

Non-farm activities provide additional income that enables farmers to spend more on their basic needs include: food, education, clothing and health care (Ana and Habte, 2017). Therefore, result of the study implied that nonfarm income has a role which is significant in maintaining farmers' livelihood and to change their living standard.

##### 4.7.1 Ability to afford farm inputs against non-farm participation

Table 19 shows that, 113 farmers out of 129 farmers which is equivalent to 88% who participated in non-farm activities afforded farm inputs. Oseni and Winters (2009) asserted that, in Nigeria farmers who earned non-farm income bought improved farm inputs such as better seeds, fertilizers, pesticides.

**Table 19: Distribution of respondents engaging in non-farm participation against ability to afford farm inputs**

Non-farm participation	Ability to afford farm inputs (AFI)		Total N
	No	Yes	
No (% within AFI)	91 (96%)	16 (12%)	107 (48%)
Yes (% within AFI)	3 (4%)	113 (88%)	116 (52%)
<b>Total (% within AFI)</b>	<b>94 (100%)</b>	<b>129 (100%)</b>	<b>223 (100%)</b>

#### 4.7.2 Having enough food for the family

Results in Table 20 shows that, 93 farmers who participated in non-farm activities out of 125 which is equivalent to 74% had enough food. It has been argued that, if non-farm income is invested in farming then, there will be an increase in farm production level (Hert, 2009).

**Table 20: Distribution of respondents engaging in non-farm participation against enough food availability**

Non-farm participation	Enough food availability (EFA)		Total N
	No	Yes	
No (% within EFA)	75 (76%)	32 (26%)	107 (48%)
Yes (% within EFA)	23 (24%)	93 (74%)	116 (52%)
<b>Total (% within EFA)</b>	<b>98 (100%)</b>	<b>125 (100%)</b>	<b>223 (100%)</b>

#### 4.8 Summary of the Results

Descriptive statistics summarized the information about the distributions of respondents. Probit model was used to test factors influencing farmers to participate in non-farm activities and age, sex, educational level of respondents and migration were identified to be significant. Propensity Score Matching (PSM) was used to the difference in average income of farmers with non-farm activities from farmers without, and found that, farmers with non-farm activities earned more income than farmers without non-farm activities. Therefore, additional non-farm income increase household income of farmers and enabling them to spend more on basic necessities.

## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATIONS

This chapter describes conclusion and recommendations made after analysis of the data gathered in this study. The conclusions and recommendations were drawn based on findings in relation to the study objectives.

#### 5.1 Conclusion

In selected villages in Mufindi district, probit model results showed that, sex, age, education level and migration were statistically significant factors which influenced individual farmers to engage in non-farm activities. Variables farm size owned and farm size cultivated were insignificant statistically.

PSM results using two matching algorithms, both showed that, the difference of an average income earned between farmers with non-farm activities and farmers with not was statistically significant. That is, farmers with non-farm activities had higher income than farmers with not. This means that, non-farm activities served as the potential alternative source of income to farmers where farmers could pay for basic needs: food, education, clothing and health care. Additional income enabled farmers to afford better farm inputs and expand farm production, hence improved livelihood.

#### 5.2 Recommendations

Government should support and encourage farmersto improve their farm income as well as non-farm income through:

- i. To improve the quality of education offered by increasing provision of capitation grants to primary and secondary schools, this will add facilities such as teaching

and learning facilities. But also increase penalties to parents who do not send their children to school. Together with this, agricultural and entrepreneurial courses should be introduced and made compulsory in primary and secondary education. As children are growing will have knowledge of agriculture and entrepreneurship, and appreciate their importance.

- ii. Subsidizing heavily on agricultural inputs such as fertilizers, seeds, pesticides so that farmers can afford them and improve farm income. Also offering micro loans to farmers will help them to access better inputs or initiate non-farm activities like opening shop.
- iii. Improving infrastructure development such as roads and bridges and trade centers. This will enable movement of farmers and farm products as well as non-farm products to meet customers and earn income.

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## APPENDICES

### Appendix 1: Questionnaire

Good day, I am *Rumulika*. I am a student of Sokoine University of Agriculture in Tanzania. I am currently interviewing farmers to obtain detailed information about “*the effects of non-farm activities on farmers’ incomes in selected villages in Mufindi District, Iringa Region*”. Your participation is voluntary. You may choose not to answer any question and you may choose to stop the discussion at any time. Refusing to participate will not affect you or your family in any way. I would like you to answer as honestly as possible. I want to emphasize that your responses will be kept *confidential*.

Are you willing to participate in this study? YES (    ), NO (    )

Name of the Village: \_\_\_\_\_

Date: \_\_\_\_\_

Name of the farmer: \_\_\_\_\_ (only first name)

### SECTION A: FARMER CHARACTERISTICS

Code	Sex Male=1; Female=0	A1. What is your age in years?	A2. What is your highest level of education?

Codes for question 1	Codes for question 2
1 = from 18 to 35	1 = no schooling
2 = from 36 to 55	2 = primary education
3 = 56 and above	3 = junior secondary education
	4 = senior secondary education
	5 = university education
	6 = vocational education

A3. Are you born here? 1=Yes ( ), 0=No ( )

A4. If not here, what made you shift to this village? 1=Parents ( ), 2=Non-farm opportunities ( )

### **SECTION B: LAND TENURE AND FARM CHARACTERISTICS**

In this section we would like to have some information about farmer's land size and ownership. **Yes=1, No=0**

B1. Do you own land? 1=Yes ( ), 0=No ( )

B2. Do you farm on the land you own? 1=Yes ( ), 0=No ( )

B3. Do you farm on another person's land? 1=Yes ( ), 0=No ( )

B4. If YES, what is the arrangement type? 1=Pledge ( ), 2=Rent ( ), 3=Sharecropping ( ), 4=Owner ( ), 5=Others ( )

B5. What is the total size of the farm land that you own in acres? ( )

B6. What is the total size of the farm land that you have rented in acres? ( )

B7. Out of your total farm land (rented or owned), what is the farm size that you have cultivated in acres? ( )

### **SECTION C: FARMER'S AGRICULTURAL PRODUCTION**

C1. Which agricultural produce have you cultivated for the past one year? 1=Tea ( ), 2=Beans ( ), 3=Vegetables ( ), 4=Maize ( ), 5=Others ( )

Agricultural Produce	C2. How many baskets were harvested for the past one year?	C3. How many baskets were sold for the past one year?	C4. What is the average price of one basket for the past one year?	C5. What is farm income earned?
Tea ( )				
Beans ( )				
Maize ( )				
Vegetables ( )				
Others ( )				
<b>Total</b>				

#### **SECTION D: LIVESTOCK HOLDINGS**

D1. Do you have livestock? 1=Yes ( ), 0=No ( ): 1=Cows ( ), 2=Goats ( ), Kondoo ( ),

Livestock	C2. How many units do you own?	C3. How many units were sold for the past one year?	C4. What is the average price of one unit for the past one year?	C5. What is livestock income earned?
Cows ( )				
Goats ( )				
Chickens ( )				
Others ( )				
<b>Total</b>				

#### **SECTION E: NON-FARM INCOME GENERATING ACTIVITIES OF THE FARMER**

E1. Do you engage in non-farm activities? **1=Yes** ( ), **0=No** ( )

E2. What are the reasons for engaging in non-farm activities?

1=To earn more money for food consumption, education, health, invest in agriculture ( ), 2=Ample Time ( ), 3=Small Farm Size Owned ( ), 4=Risky in Farming ( ),

5=Covert Agricultural Land to Residential Plots ( ), 6=Selling Agricultural Land to New Comers ( ), 7=Others ( )

Non-Farm Activities	E3. How much money do you earn per month in TZS?	E4. How much money do you earn per year in TZS?
1=Wage Employment		
2=Self Employment		
3=Others		
<b>Total</b>		

#### **SECTION F: OTHER SOURCES OF INCOME OF THE FARMER**

Other Sources of Income	F1. How much money do you earn per month in TZS?	F2. How much money do you earn per year in TZS?
1= Hired in Others' Farms (Off-Farm Income)		
2=Remittance		
3=Others		
<b>Total</b>		

#### **SECTION G: LIVELIHOOD INDICATORS OF THE FARMER**

G1. Do you have enough food for you and your household? 1=Yes ( ), 0=No ( )

G2. Can you afford better farm inputs? 1=Yes ( ), 0=No ( )

G3. What is the mode of your transport? 1=Feet ( ), 2=Bicycle ( ), 3=Motor Cycle ( ), 4=Public Transport ( ), 5=Private Car ( ), 6=Others ( )

G4. What kind of house do you live in? 1=Block house with zinc roof ( ), 2=block house with catch roof ( ), 3=Mud house ( ), 4=others ( ) .....

G5. Do you own or rent the house you live in? 1=Own ( ), 0=Rent

**THE END**

**THANK YOU FOR YOUR COOPERATION**

**DODOSO**

Habari, naitwa *Rumulika*. Mimi nimwanafunzika Chuo Kikuu cha Kilimo Sokoine kilicho Tanzania. Ninawahoji wakulima likupata arifa kuhusu “*mchangowakazisisizozashambakatikapato la wakulimakatikavijivina vyo endelea katika wilaya Mufindi, mkoani Iringa*”. Ushiriki wakoni wahi yari. Unaweza kutojibu swali lote hata kuachakuendelea namajadiliano mudawo wote. Kuachakuendelea hata kuthirifamili ya kokwanam nayoyote. Ningependeu jibu maswali kwa uaminifu. Nataka kusisitiza kuwamajibu ya kyo yata kakuwa **siri**.

Je, upotayarikushiriki? NDIYO ( ), HAPANA ( )

Jina la Kijiji: \_\_\_\_\_

Tarehe: \_\_\_\_\_

Jina la mkulima: \_\_\_\_\_ (Jina la kwanza tu)

**SEHEMU A: TAARIFA ZA MKULIMA**

Namba	Jinsia Mwanaume=1; Mwanamke=0	A1. Unaumrigani (miaka)?	A2. Unakiwangoganikikubwa cha elimu?
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Nambakwaswali 1	Nambakwaswali 2
1 = from 18 to 35	1 = no schooling
2 = from 36 to 55	2 = primary education
3 = 56 and above	3 = junior secondary education
	4 = senior secondary education
	5 = university education
	6 = vocational education

A3. Umezali wakijijihiki? 1=Ndiyo ( ), 0=Hapana ( )

A4. Kama siyokijijihiki, ninikilikuleta? 1=Wazazi( ), 2=Fursazisizozashamba ( ),  
3=Ndoa ( )

### **SEHEMU B: UMIRIKI WA ARDHI NA TAARIFA**

Katikasehemuhiitungependakupatataarifakuhusumkulima, kiasichake cha ardhinaumiliki.

B1. Unamilikaardhi? 1=Ndiyo( ), 0=Hapana ( )

B2. Ulilimakatikaardhiyako? 1=Ndiyo( ), 0=Hapana ( )

B3. Ulilimakwenyeardhiyantumwingine? 1=Ndiyo( ), 0=Hapana ( )

B4. Kama NDIYO, kwamakubalianogani? 1=Ahadi( ), 2=Malipo ( ), 3=Mazao ( ),  
4=Mengine ( )

B5. Unamilikaardhikiasiganikwaujumla wake katikahekari? ( )

B6. Umekodiardhikiasiganikwaujumla wake katikahekari? ( )

B7. Katikaardhiyakoyote (uliyokodi au unayomiliki), umelimakiasigani cha  
ardhikatikahekari? ( )

### **SEHEMU C: UZALISHA WA MKULIMA KATIKA MAZAO**

C1. Ni mazaoganiulilimakatikakipindi cha mwakammojauliyopita? 1=Chai ( ),  
2=Maharage ( ), 3=Mbogamboga ( ), 4=Mahindi ( ), 5=Mengine ( )

Mazao	C2. Ulivunandoong apikatikakipindi cha mwakammojaul iyopita?	C3. Uliuzandoonga pikatikakipindi cha mwakammojau liyopita?	C4. Kwawastanindoomojailiuzwak wabeiganikatikakipindihusika?	C5. Ulipatak iasigani?
Chai( )				
Maharage( )				
Mahindi( )				
Mboga mboga ( )				
Mengine( )				
<b>Jumla</b>				

#### SEHEMU D: UZALISHA WA MKULIKA KATIKA MIFUGO

D1. Unamifugo? 1=Ndiyo( ), 0=Hapana ( ): 1=Ng'ombe ( ), 2=Mbuzi ( ), Kuku( ),

Mifugo	C2. Unaowan gapi?	C3. Uliuzawangapikatikamwakam mojauliyopita?	C4. Wastaniwabeikwaki lammoja?	C5. Ulipatakias igani?
Ng'ombe( )				
Mbuzi ( )				
Kuku ( )				
Wengine( )				
<b>Jumla</b>				

**SEHEMU E: KAZI ZA ZISIZO ZA SHAMBA**

E1. Unafanyakazisisizozashamba? **1=Ndiyo**( ), **0=Hapana** ( )

E2. Kama ndiyo, ninikimesababishaukafanyakazisisizozashamba?

1=Kupatapesazaidiyamatumizikatikachakula, afyanashamba( ), 2=Mudawaziada ( ),

3=Nina ardhi/shambadogo ( ), 4=Kilimohakitabiriki ( ), 5=Eneolangunimejenga ( ),

6=Nimeuzaardhi/eneolangukwawageni ( ), 7=Nyingine ( )

Kazisisizozashamba	E3. Ulipata kiasiganikwamwezikat ika TZS?	E4. Ulipata kiasiganikwamwakaka tika TZS?
1=Kuajiri wakwamshah ara		
2=Kuajiri mwenyewe		
3=Zingine (Taja)		
<b>Jumla</b>		

**SEHEMU F: VYANZO VINGINE VYA MAPATO VYA MKULIMA**

Vyanzovingine vyamapato	F1. Ulipata kiasiganikwamwezika tika TZS?	F2. Ulipata kiasiganikwamwakaka tika TZS?
1=Msaada kutokakwand ugu		
2=Mikopo		
<b>Jumla</b>		

**SEHEMU G: VIASHIRIA VYA MAENDELEO KWA MKULIKA**

G1. Unachakula cha kutoshawewenafamilyayako? 1=Ndiyo( ), 0=Hapana ( )

G2. Unamududhanazakilimo? 1=Ndiyo( ), 0=Hapana ( )

G3. Unausafiriwaainagani? 1=Miguu( ), 2=Baisikeli ( ), 3=Pikipiki ( ), 4=Umma ( ),  
5=Garibinafsi ( ), 6=Mwingine ( )

G4. Unaishinyumbayaainagani? 1=Tofalizablokunabati( ), 2=Block napaayambao ( ),  
3=Tope ( ), 4=Nyingine ( ) .....

G5. Nyumbaunayoishiyako au umepanga? 1=Yangu( ), 0=Nimepanga

**MWISHO**

**NAKUSHUKURU KWA USHIRIKIANO**