**FACTORS INFLUENCING FARMER’S INCOME IN TANZANIA: EVIDENCE FROM BABATI DISTRICT, TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN ECONOMICS OF** **OPEN UNIVERSITY OF TANZANIA**

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# CERTIFICATION

# The undersigned certifies that he has read and therefore recommends for acceptance by the Open University of Tanzania, a dissertation titled; “Factors influencing Farmers’ Income in Tanzania: Evidence from Babati District” for the partial fulfilment of the requirements for the Degree of Masters of Science in Economics.

…………………………………….

Dr. Felician Mutasa

(Supervisor)

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Date

# DEDICATION

I would like to dedicate this work to my lovely wife Phonitha John Ngombe, My Son Blessings Benitho Kavenuke and daughters Benedicta Benitho Kavenuke and Benphona Benitho Kavenuke for being patient in my absence and giving all the support throughout my study. Their support and encouragement helped me to make this work successful.

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# ABSTRACT

This study assessed the critical factors that determine farmer’s income in Babati District Council, Manyara region, Tanzania. The approach and research design used were quantitative approach and cross-sectional survey respectively. Purposive and simple random samplings were employed. Closed and open-ended questionnaires together with documentary review from the institution’s report were used as tools of data collection. Results showed that on average every smallholder maize farmer statistically found to earn net farm income of TZS 1,159,913 generated out of maize farming enterprise per annum. Empirically, the findings also showed that by use of stepwise multiple regressions, eight critical determinants were found to be the main factors influencing net cash income out of ten examined. These were age of a farmer, level of education, capital used, farm size, use of improved agricultural inputs, experience of a farmer, farm output/yield and marketing cost. The ten factors examined account for about 72.4% of the total variance in farmers’ income within a given year. The results implies that farm size, farm yield, education level, experience, marketing cost, age, capital invested and use of improved agricultural inputs are factors affecting farmer’s income with significant levels of 1%, 5% and 10%. The researcher’s recommendation is that the government should proceed with provision of sound policy that make capital and credit facilities more accessible to rural farmers and change of mind to agricultural extension staff is highly demanded to serve farmers in maize farming practices and hence resulting into increase of maize farmer’s income.

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# LIST OF ABBREVIATIONS

ASDP Agricultural Sector Development Program

ASDS Agricultural Sector Development Strategy

BDC Babati District Council

DADPs District Agricultural Development Programs

DED District Executive Director

DFID Department for International Development in United Kingdom

FAO Food Agricultural Organization

FYM Farm Yard Manure

GDP Gross Domestic Product

IFAD International Food and Agricultural Development

OLS Ordinary Least Squares

OUT Open University of Tanzania

PHC Population and Housing Census

NBS National Bureau of statistics

RDS Rural Development Strategy

SLA Sustainable Livelihood Approach

SPSS Statistical Package for Social Sciences

TFP Total Factor Productivity

TZS Tanzania Shillings

URT United Republic of Tanzania

VIF Variance of inflation factor

# CHAPTER ONE

# 1.0 INTRODUCTION

## 1.1 Background

A number of studies from developing countries have suggested that diversification of rural economy towards non-farm activities has considerable potential to augment farmers’ income and reduce poverty (Reardon et al., 1998; Barret et al., 2001; Lanjouw, 1999; de Janvry et al., 2005). More than 70% of the world’s 1.8 billion poor live in rural areas and most of them are experienced living in developing countries (World Bank, 1999). 75% of the poor people in developing countries live in rural areas (World Bank, 2008). On the average, about 80% to 90% in Asia and Africa, of all target poverty groups are located in the rural areas (Todaro, 2000). Poverty is mainly a rural phenomena and rural poverty is more prevalent, deeper, and more severe than urban poverty (Chaudhry, et al. 2006).

Rural poverty is further pronounced in unlimited income generating opportunities due to the absence of commercial and industrial facilities or lack of the necessary resources to establish them. Theoretically, the rural areas of a region or country lie outside the densely-built up environments of towns, cities and sub-urban villages and mostly are engaged primarily in agriculture (Adebayo, 1998). A study conducted in state of Punjab indicated that migration of people from rural to urban areas affects the income of rural areas (Oberoi & Singh, 1980).

Increasing agricultural production in order to feed population, to produce raw materials for local industry and export in sufficient qualities to sustain a healthy economy, is the major plan of the country (Voortman, 1985). All productive resources in the economy are owned by several people. The owners sell the services of the resources and the payments received in exchange constitute their incomes. A farm labourers income depends on the number of labour hours sold and the price or wage rate of labour. This income in turn determines the share of the economy’s output of goods and services that can be purchased.

Given the implications for the welfare of individuals and families in the economy, it is little wonder that the determination of resource prices is frequently a matter of controversy. What is a just return or a fair return for a farm household? Questions such as these go to the heart of often emotional issue of income distribution and the factors that influence distribution of income. Even if every individual in an occupation such as farming are of identical training and even if there is complete mobility of labor among different agricultural zones of the state still wide differences in incomes arise, due to differences in, age, size of community, gender, living costs, hours spent on farm, education and alike. (Matlon, 1979).

Expressing the stability of the economic growth in relation to poverty reduction and farmers’ income is tricky, partly because the relationship is multifaceted and dynamic. To understand the relation, there is a need to see the background and phases of the economy. Tanzania passes through distinct phases of socioeconomic development since 1961 after independence, which has made a tremendous contribution to the current economic situation. The first phase was from 1961-1980, where the country had deliberated effort to build national unity. The second phase was from 1981 to 1995 with a focus on macroeconomic stability, quality of public financial management, policy development and implementation, reducing government expenditure and minimizing domestic and non-concessional borrowing. In this phase there was an adoption of structure adjustment and reforms which were aimed at restoring stabilization and growth with no clear socio-economic transformation targets. The phase is characterized by rapid but jobless growth (Kilama & Wuyts, 2014), low productivity within and between productive sectors in which agriculture absorbed all surplus labor within the economy.

However, there was a degree of improvement in the degree of environment of economic growth. The third phase was from 1996-2013, in this phase the country embarked on more comprehensive economic and social policies implementation with the focus in the development agenda. The target was on higher level of investment in human capital and physical infrastructure, improvement of business environment and strengthening of government capacity (Lyatuu, Nie, & Fang, 2015) was the result of second phase efforts.

Recently the country’s focus is on the economic development in the context of improving livelihood of farmers by strengthening its fiscal position through fiscal consolidation measures but targeting to be middle income country through transformation towards semi-industrialized economy (Lyatuu et al., 2015). The measure goes hand in hand with different strategies developed which encounter number of challenges to compete, but using its policy to make use of its available opportunities and engender economic development in rural areas, then its competition policy will very quickly trigger significant increases in productivity and investment in the manufacturing sector provided that inclusive agriculture is a major driver of the economic development.

Agricultural sector in Tanzania provides about 66.9% of employment, accounts for about 23% of Gross Domestic Product (GDP), 30% of exports and 65% of inputs to the industrial sector (URT, 2016). There has been improvement in productivities of some of the crops including maize and on the other hand there has been a decline in some previously key cash crops (cotton, cashew-nuts, coffee and sisal to mention but a few). The area under irrigation is less that 10 % of the potential and rate of investment in irrigation infrastructure is still not encouraging (URT, 2016).

According to the 2012 Population and Housing Census – PHC (URT, 2016); Manyara Region has a total of 201,604 households out of 271,050 households equivalent to 74% who are engaged in agricultural activities. Babati District Council (BDC) is the only Council that rank first to have largest number of households (46,604 households) engaged in agriculture. This is well stipulated in Table 1.1

Table 1.: Households Engaged in Agriculture in Manyara Region

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| District | Total number of households | Households engaged in agriculture | Percentage of households engaged in agriculture | | |
| Total | Rural | Urban |
| Manyara | 271,050 | 201,604 | 74.4 | 89.1 | 10.9 |
| Babati | 59,853 | 46,604 | 77.9 | 95.3 | 4.7 |
| Hanang | 47,929 | 38,980 | 81.3 | 91.0 | 9.0 |
| Mbulu | 53,229 | 42,827 | 80.5 | 86.6 | 13.4 |
| Simanjiro | 38,546 | 21,036 | 54.6 | 93.9 | 6.1 |
| Kiteto | 50,717 | 40,512 | 79.9 | 91.6 | 8.4 |
| Babati Town | 20,776 | 11,645 | 56.1 | 49.6 | 50.4 |

**Source:** URT, 2016 (National Bureau of Statistics – NBS)

As observed from the table above, 77.9% of the total numbers of households in BDC engage in agriculture. Thus, the agricultural sector in BDC is the leading sector of the Council’s economy, employing over 70% of the adult labor force. The sector impacts on many aspects of development in the Council. Apart from striving to meet the food needs of the citizen, the agricultural sector impacts strongly on other socio-economic needs of the people including the overall quality of life of its people. At the same time, agricultural production and productivity depend largely on the quality of land and sustainable practices. Consequently, there is a need to make agriculture economically viable by seeking a balance between efficient and productive agricultural enterprise and environmental protection and sustainability (Olawepo, 2010).

However, various studies have established that large proportion of income generated is allocated to family expenses such as food, education and health services and that little income are allocated to farm inputs(Makorere and Mbiha, 2012**)**. With these few remarks, there is a need of commercializing food crops for the purpose of supporting cash crops, increasing farmers’ income and farmers’ productivity as well.

## 1.2 Statement of the Problem

The capitalization in agriculture for farmers’ income in Tanzania has always been problematic due to the process of their deposition in rental rates, their prices of farmland and the values of fixed asset This is because most of the rural farmers do not keep records of the costs incurred during agricultural processes and most of them are not literate (Makorere & Mbiha, 2012). Smallholder farmers generate their income mainly by the sale of agricultural products (especially food crops), livestock and livestock by-products, non-agricultural activities (off-farm employment, hand-craft items, local brew, charcoal and petty trading and remittance and gifts from their relatives and friends (Collier et al., 1996; FAO/Kilimo, 1995, Hella & Yona, 1999).

Maize is among the main staple food crop that is expected in increasing income for most households in Manyara region (Rural and Urban), Maize crop has been produced in different region in Tanzania, it is produced as a food crop and cash crop as well. In Manyara region a total of 196,759 households out of 271,050 households were engaged in maize growing during the 2011/2012 agricultural year (URT, 2016). Despite of large number of household’s involvement in maize production, still the production level is not at the prevailing rate in increasing farmer’s income of the households in the region. Many farmers in rural areas of Manyara are unaware of the production levels of maize crop which contributes to low production for farmers who depends on maize as their source of income. Despite their involvement in maize production also the factors that affect income to maize farmers in Manyara are unknown either. This study intended to discover the levels of maize production which could help in increasing maize farmers’ income as well as the factors of maize production contributing to farmers’ income.

Many studies on maize have been conducted on farmer’s income. Baha (2013) for example discussed on the decrease of yield due to the technical efficiency on maize production but in Manyara little have been studied on the contributing factors on maize production to increase farmers income. The study will help farmers to increase their levels of production which will help them to increase income and production as well.

## 1.3 Objectives of the Study

### 1.3.1 General Objective

The general objective of the study was to assess factors affecting maize farmer’s income in Babati District Council (BDC), Manyara region, Tanzania Mainland.

### 1.3.2 Specific Objectives

The main objective of this study was accomplished through the following specific objectives:

1. To examine factors that influence household’s maize production
2. To determine factors influencing income differentiation among rural farmers
3. To analyze critical factors affecting maize farmer’s income

## 1.4 Research Hypotheses

This study was done through testing the following hypotheses:

### 1.4.1 Hypothesis 1

H0: There is no significant influence of farm size, marketing cost, farm yield, education level, capital invested and use of agricultural inputs onto household maize production.

H1: There is a significant influence of farm size, marketing cost, farm yield, education level, capital invested and use of agricultural inputs onto household maize production.

### 1.4.2 Hypothesis 2

H0: There is no significant influence of farm size, level of education, agricultural inputs, experience of a farmer and capital invested onto income differentiation among rural maize farmers.

H1: There is significant influence of farm size, level of education, agricultural inputs, experience of a farmer and capital invested onto income differentiation among rural maize farmers.

**1.4.3 Hypothesis 3**

H0: There is no significant influence of education level, capital invested, farm size, farm yield, agricultural inputs and farmer’s experience onto farmer’s income.

H1: There is significant influence of education level, capital invested, farm size, farm yield, agricultural inputs and farmer’s experience onto farmer’s income.

## 1.5 Significance of the Study

This study is important for the main reason that the farmers’ income in this study is used as a major tool for the isolation of basic factors that ought to be accorded priority in subsequent development policy as there is a need to make agriculture economically viable by seeking a balance between efficient and productive agricultural enterprise and environmental protection and sustainability. This is also helpful in the realization of government efforts to improve maize production as well as maize farm income generation in the Council in general. However, the study serves as the reference for other researchers who are interested with the study of the determinant factors among household farmers’ income especially on maize producers in Tanzania.

**CHAPTER TWO**

# 2.0 LITERATURE REVIEW

## 2.1 Overview

This chapter was divided into two sections. Section one gave clarifications on theories and concepts of other researchers that are related with the study called theoretical literature review while section two gave clarification on ideas of other people’s presented works related to the research topic called empirical literature review and section three identified the research gap.

## 2.2 Theoretical Literature

The concept of farmers’ income falls into income theory which in turn, income theory was gradually developed by Tooke, Wick-sell and Afflation and finally by Keynes. According to them, income theory is about changes in income rather than in the money supply which cause changes in the aggregate demand. When income increases, aggregate demand for goods and services also increases. People spend more and the price level rises. On the contrary, with the decline in income, the aggregate demand falls. People spend less and the price level falls.

Therefore, changes in the price level depend upon the volume of expenditure in the economy which in turn is determined by changes in the level of income. And the level of income depends upon the volume of saving and investment in the economy. Thus changes in the price level or value of money are caused by the income and expenditure of the community or by the volume of saving and investment. Thus income and expenditure, and saving and investment are the two approaches applied into the income theory.

According to Thomas Tooke (1774 – 1858), the father of the income theory of Money; he defined the income theory of money as nominal prices formed by interaction of nominal expenditures streams with real streams of goods sold. He linked nominal prices with nominal incomes. It is with Tooke that the idea of prices and endogenous money formed. Thus, the income theory of money is a theory of nominal prices. It explains the process of the determination of monetary prices in the market economy. It is widely recognized that under normal assumptions, it is only the relative prices which matter to the general equilibrium model.

### 2.2.1 The Theory of Income, Output and Employment

Keynesian theory entails that, employment depends upon effective demand. Effective demand results in output. Output creates income. Income provides employment. Since Keynes assumes all these four quantities (effective demand, output, income and employment) equal to each other. He regarded employment as a function of income. Effective demand is determined by two factors, the aggregate supply function and the aggregate demand function. The aggregate supply function depends on physical or technical conditions of production which do not change in the short-run. According to Keynes, employment can be increased by increasing consumption and/or investment. Consumption depends on income and when income increases, consumption also increases but not as much as income. In other words, as income rises, saving rises.

Consumption can be increased by raising the propensity to consume in order to increase income and employment. But the propensity to consume depends upon the psychology of the people, their tastes, habits, wants and the social structure which determine the distribution of income. All these elements remain constant during the short-run. Therefore, the propensity to consume is stable. Employment thus depends on investment and it varies in the same direction as the volume of investment.

[John Maynard Keynes](http://www.britannica.com/biography/John-Maynard-Keynes) offered new thinking on income and employment theory with the publication of General Theory of Employment, Interest and Money (1936). Building on his theory, Keynesians have stressed the relationship between income, output, and expenditure. Since transactions are two-sided—in that one person’s income is another person’s expenditure—the relationship could be expressed in the form of a simple equation: Y = O = D, where Y is the national income (i.e., purchasing power), O is the value of the national output, and D is national expenditure. What this equation means is that effective demand is equal to income as well as to output. Since consumers can either spend or save their income, Y = C + S, where C is [consumption](http://www.britannica.com/topic/consumption) and S is savings.

Similarly, on the output side, production is either sold to final customers or invested in inventory or new capital equipment, (such as production plants or machinery). So O = C + I, where C represents sales to final customers and I investment. Thus, C + S = C + I and, therefore, S = I.

In the Keynesian analysis, the equilibrium level of employment and income is determined at the point of equality between saving and investment. Saving is a function of income, i.e. S=f (Y). It is defined as the excess of income over consumption, S=Y-C and Y = C + I or Y-C = I. At equilibrium level I = S and this provides Y-C = S where S is Saving, I is the Investment, C is Consumption and Y is Income. The fall in incomes further reduces consumer demand while also reducing the rate of savings. In reality, a fall in investment and an increase in savings will both produce a dampening effect on the economy. Conversely, a rise in investment or an increase in consumer spending will tend to stimulate the economy.

### 2.2.2 Saving – Investment Approach to Income Theory

An alternative to the Keynesian income-expenditure theory is the saving investment approach to income theory. In fact the income-expenditure approach (Y = С + I) is the same thing as the saving-investment approach. Both saving (S) and investment (I) are defined as the excess of income over consumption (Y-C) so that they are necessarily equal.

Moreover, the total money income (Y) is the value of goods and services produced in any period of time and expressed in terms of money. It is determined by the remuneration paid in terms of money ю the factors of production. Thus it also refers to the sum of total expenditure (E) incurred on goods and services pricing a period. On the other hand, the ‘real’ income is the total value of real money value of goods and services expressed in terms of a general price level of a particular year taken as the base. It is clear from the above that total money income equals total expenditure which, in turn, is equal to consumption expenditure (C) plus investment expenditure (I). Therefore, symbolically, Y = E = С + I.

### 2.2.3 Interrelation of Output, Employment and Prices

By defining the interrelation of the macroeconomic factors Output, employment and prices in an economy, government try to create policies that contribute to economic stability. Modern interest in income and employment theory was triggered by the severity of the [Great Depression](http://www.britannica.com/event/Great-Depression) of the 1930s in the United States and Europe. In its failure to explain the persistent high levels of unemployment and the low levels of business productivity, the prevailing school of [classical economics](http://www.britannica.com/topic/classical-economics) lacked solutions for the problems of that era.

This example illustrates how changes in savings or investment will affect changes in national income, but it does not show the extent of those changes. The actual degree of change is determined by what Keynes called the “[consumption function](http://www.britannica.com/topic/consumption-function)” (that is, the level of spending that is based on disposable income). Keynes’s primary aim in developing his theory was to show that, under certain conditions the economy could become stuck in disequilibrium, with productive resources in surplus (meaning high level of unemployment) but income and output unable to rise sufficiently to reach equilibrium. Put simply, Keynes argued that, when business was unwilling or unable to increase investment because of low demand, additional government spending could spur new spending and eventually pull the economy out of disequilibrium. Keynesians believe that [fiscal policy](http://www.britannica.com/topic/fiscal-policy)—such as an increase in government expenditure or a reduction in taxation—is the most effective way to offset the lack of private demand.

A competing theory of income and employment, the monetarist approach, places the [quantity](http://www.britannica.com/topic/quantity-theory-of-money) of money in the controlling role. The analysis of the effects of increasing or decreasing the [money supply](http://www.britannica.com/topic/money-supply) is approximately parallel to that of the consumption-and-savings relation. The rules of thumb derived from the two theories may, in fact, be combined: an excess demand for goods or an excess supply of money (the two may be seen as aspects of the same phenomenon) will be associated with rising income; similarly, an excess supply of goods or an excess demand for money will be associated with falling income. Monetarists, such as [Milton Friedman](http://www.britannica.com/biography/Milton-Friedman), have advocated [monetary policy](http://www.britannica.com/topic/monetary-policy) as the proper countercyclical tool of government.

Furthermore, income depends upon relation between saving and investment. So long as saving and investment are equal, there will be the equilibrium level of income and the price level will be stable. If saving and investment are disturbed, the price-level also changes via the change in expenditure. If saving exceeds investment, it means that people reduce their expenditure on goods and services. They are hoarding more money and spending less. This reduces the velocity of circulation of money. This leads to a reduction in the income of the producers of goods and services. Reduced expenditure and income lead to a fall in the price level. As prices fall, investment also declines due to a fall in the marginal efficiency of capital which leads to further falling income, output, employment, and prices. This process will continue till prices reach the bottom of the depression. If investment exceeds saving, people will increase their expenditure on goods and services. They are spending more and saving less. This causes the velocity of circulation to increase. This increases the income of the producers of goods and services. Increase in expenditure and income lead to a rise in the price level.

This will increase the profit expectations or marginal efficiency of capital. As a result, investment will increase further which will, in turn, raise employment, income, expenditure, output and prices to still higher levels. But the increase in investment leading to an increase in aggregate expenditure, demand, and income do not lead to a rise in the price level immediately. So long as the output of goods and services rises proportionately with the increase in the demand for goods and services, there would not be a general rise in the price level. If output does not increase proportionately, increase in investment will increase income and the price level. But increase in output is possible only if there are unemployed resources in the economy. When the economy reaches the full employment level, further increase in income will not raises output to the level of increase in aggregate expenditure. But it will to an upward rise in the price leveling the same proportion as the increase in income. To conclude, it is the inequality in saving and investment that brings about changes in the price level, and changes in the price level are due to changes in income rather than in the quantity of money. However, employment or unemployed of a number of determinant factors results into changes in income.

## 2.3 Empirical Literature

Advocates of trade liberalization argue that agricultural trade liberalization will expand the small domestic market, provide access to foreign direct investment, create greater competition, facilitate technology transfer, generate marketing networks, and provide much-needed technical and managerial skills, resulting in higher economic growth (Annabi *et al.*, 2006: 4; Henry *et al.*, 2009: 237; McCulloch *et al.*, 2003: 15, 16; Zhang, 2008: 175). They argue that agricultural trade liberalisation contributes to higher economic growth through technological transformation and productivity improvement and thereby reduces poverty.

However, there has been a substantial debate on welfare gains and losses from economic growth resulting from technological transformation as a consequence of agricultural trade liberalisation. This debate is much more about distributional consequences and welfare implications than net gains and net losses (DFID, 2004: 10; Mendola, 2007: 373; Orden, 2006: 378; Pyakuryal *et al.*, 2010: 20, 31; San Vicente Portes, 2009: 945). The distributional impact of this growth can be mixed despite the extensive spread of technological transformation in agriculture. Even where agriculture retains comparative advantage, the liberalisation of trade raises questions about the pro-poor effects of agricultural productivity improvement due to issues related to income distribution (Acharya, 2011: 61; Acharya and Cohen, 2008: 1057; Keleman, 2010: 13; Rakotoarisoa, 2011: 147). Therefore, the effect of agricultural trade liberalisation on welfare is highly contested in the development economics literature (Keleman, 2010: 13; Rakotoarisoa, 2011: 147; Sexton *et al.*, 2007: 253).

The first fundamental theorem of welfare economics argues that subject to certain exceptions – such as externalities, public goods, economies of scale and imperfect competition – every competitive-equilibrium is Pareto-optimal. Similarly, the second fundamental theorem states that every Pareto-optimal allocation of resources can be realised as the outcome of competitive equilibrium after a lump-sum transfer of claims on income (Blaug, 2007: 185; Bliss, 1987: 27; Greenwald and Stiglitz, 1986: 230; Krugman and Obstfeld, 2006: 225; Stiglitz and Charlton, 2007: 28, 29; Tribe *et al.*, 2010: 186).

In fact, Pareto-optimality may not be achieved in the farm sector in the sense that agricultural trade liberalisation may affect some groups of rural households adversely despite the gains from this process by other groups. Moreover, perfect competition may not exist in the agriculture of developing countries due to market failure in the form of some externalities.

Although many studies indicated that agricultural trade liberalisation had made a significant contribution to economic growth through technological transformation in the agricultural sector, understanding the process of pro-poor economic growth and explaining the vast differences in economic performance across countries have been fundamental challenges for researchers as well as for policy makers (Chiquiar, 2008: 71; Henry*, et al.*, 2009: 72; Kong, 2007: 1; Topalova, 2010: 3). One of the main reasons for the lack of empirical consensus on growth determinants relates to model specification, the choice of control variables and measurement shortcomings (Acharya, 2011: 61; Achterbosch and Roza, 2007: 33, 34; Narayanan *et al.*, 2010: 755).

The impact of agricultural trade liberalisation on the welfare of rural households depends on not only how income is distributed to them but also what happens to average living standards of rural households. Even the same level of productivity growth may result in various levels of poverty reduction in different countries depending on their respective policies and income distribution (Ravallion, 2004: 12). Ravallion (2004) argued that it should point to implications for policies that would be needed for rapid poverty reduction, in addition to promoting higher growth. He suggested that two sets of factors could be identified as the main proximate causes of the differing rates of poverty reduction at given rates of growth – the initial level of inequality, and how inequality changes over time. The higher the initial inequality in a country, the less is the gain from growth that tends to be shared (Orden, 2006: 379; Ravallion, 2004: 12; San Vicente Portes, 2009: 946; Susila and Bourgeois, 2008: 72, 76).

One of the key issues raised repeatedly in development economics is the mechanism through which an economy can grow fast and at the same time can lead to a more productive use of underutilised resources (Duncan and Quang, 2003: 6; Nissanke and Thorbecke, 2007: 2; Ruda, 2007: 711; Susila and Bourgeois, 2008: 75). This is another way of saying that development economics and good development strategies are about identifying technological transformations that lead to higher economic growth while simultaneously contributing to a decline in the numbers of underemployed and unemployed workers – ultimately accelerating poverty reduction (Duncan and Quang, 2003: 6; Nissanke and Thorbecke, 2007: 2; Ruda, 2007: 711; Susila and Bourgeois, 2008: 75).

Agricultural growth may reduce poverty through direct effects on farm productivity, incomes, and employment. It may also generate indirect impacts on the welfare of rural households through the growth linkage with the non-farm sector as well as through its impacts on food prices (Adeoti and Sinh, 2009: 6; Bezemer and Headey, 2008: 1343; Byerlee *et al.*, 2005: 4; Popli, 2010: 803; Thirtle *et al.*, 2001: 11; Valenzuela *et al.*, 2005: 1). There have been arguments that the poor typically spend a high share of their income on staple food; therefore, they benefit from a decline in the price of staple food induced by productivity improvement as a result of agricultural trade liberalisation. Benefits are greater for the urban poor and landless rural labourers since they are net food purchasers (Adeoti and Sinh, 2009: 6; Bezemer and Headey, 2008: 1343; Byerlee*, et al.*, 2005: 5).

Although agricultural trade liberalisation may improve productivity through technological innovation, this growth may not be pro-poor (Meijerink and Roza, 2007: 11; Popli, 2010: 803, 811; Ravallion, 2003: 15; 2009: 28, 29). However, some studies such as Byerlee, Diao and Jackson (2005), Winters, McCulloch and McKay (2004), and Bezemer and Headey (2008) argued that interaction of productivity growth, farm income, employment, and food prices could lead to a pro-poor outcome depending on two key conditions.

Firstly, agricultural productivity per unit of labour must increase to raise farm income, but agricultural productivity per unit of land must increase at a faster rate than that of labour in order to raise employment and rural wages. Secondly, increased Total Factor Productivity (TFP) in agriculture must result in a decrease in real food prices, but the TFP must increase faster than food prices decrease for farm profitability to rise and for poor consumers to benefit from lower food prices. Over the past three decades, Indian agriculture has grown at an annual rate of around 3 per cent. This has helped improve farm incomes and reduce rural poverty (Datt and Ravallion, 1996; Warr, 2003).

However, of late, the farm sector has come under stress — the growth therein being decelerated to 2.7 per cent per annum during 1995-96 to 2009-10 from 3.2 per cent per annum during 1980-81 to 1994-95. But, the more worrisome is the continuance of excessive employment pressure on agriculture, despite a significant decline in its share in the national income. The sector engaged 52 per cent of the country’s workforce in 2009-10, compared to 69 per cent in 1983, while its share in the GDP declined from 40 per cent to 15 per cent during this period.

Further, the Indian agriculture is dominated by small landholdings, and the average size of landholding has shrunk to 1.16 ha in 2010-11 from 1.84 ha in 1980-81. Given these trends, there arises a basic question: how far farm households would survive on such tiny pieces of land? In a recent study, Chand *et al*. (2011) have reported that if agriculture were to the sole source of income for small landholders, the majority of them would have remained poor. A number of studies from developing countries have suggested that diversification of rural economy towards non-farm activities has considerable potential to augment farmers’ income and reduce rural poverty (Adams and He , 1995; Adams, 2001; Reardon *et al*., 1998; 2007; Barrett *et al*., 2001; Lanjouw, 1999; de Janvry *et al*., 2005).

Lanjouw and Shariff (2002) have found the non-farm income to be neither inequality-increasing nor inequality-decreasing. Lanjouw and Stern (1993), on the other hand, had reported a strong un-equalizing effect of non-farm income on rural income inequality. Sen (1994) too had indicated that an increase in non-farm income can lead to worsening of income distribution due to lower barriers for the rich in transiting from farm to nonfarm sector. The rural non-farm sector is quite heterogeneous in India, and its distributional consequences are likely to vary depending on whether an income source is accessible to the rich or the poor.

Birthal and Singh (1995) had reported that non-farm wages have an equalizing effect on income distribution, while non-farm business, salary and transfer incomes have an opposite effect. Lanjouw and Shariff (2002) have observed the distribution of wages to be skewed towards the poor, and salaries towards the rich. Evidence from other countries is also mixed. Reardon *et al*. (1998) have reported myriad types of relationship of non-farm income with landholding size and household income. Adams and He (1995) in Pakistan and Adams (2001) in Egypt have found inverse relationships between non-farm income and land ownership as well as household income. The nonfarm income diversification in China has been found to reduce income inequality and poverty (de Janvry *et al*., 2005). The studies from Rwanda (Dabalen *et al*. 2004), Jordan (Adams, 2001), Burkina Faso (Reardon and Taylor, 1996) and Tanzania (Collier *et al*., 1986), on the other hand, have found that non-farm income has un-equalizing effect on income distribution.

In a recent study in selected countries of Asia, Africa and Latin America, Davis *et al*. (2007) have reported unequalizing effect of most non-farm income activities on income distribution. Nevertheless, in the land-scarce, labour-surplus countries like India, the importance of non-farm income sources to the poor cannot be undermined. From an extensive review, Coppard (2001) has concluded that ‘non-farm diversification is important for the landless and small landholders, and a growing non-farm sector can reduce rural poverty, but may be accompanied by worsening income distribution because of differential access of the poor and the rich to non-farm income sources.’

## 2.4 Studies in Tanzania

According to the Tanzania’s economy, agriculture sector is the backbone of the economy of the Country. It accounts more than 80% of the country’s population and about 40% of the export of the country depends on agriculture (Hoguane, 2000). Maize is the main food crop of Tanzania averaging 4.5 million metric tons in 2010/2011 seasons, Tanzania is endowed with more than 3.3 million hectares land with suitable climate (medium-high elevation) for the production of specialty maize that commands high prices on the world market. The current average yield per hectare is between 1.2 ton/ha (MOAFSC statistics 2011/12 and 2.0 tons/ha (FAOSTAT 2012).

Tanzania has the capacity to produce 1.3 – 1.5 metric tons per hectare annually if small-scale farmers were to adopt improved farming practices. Maize production has been increasing from year to year due to priority set by the government. Maize production in Tanzania has been increasing from year to year due to priority has been provided by the government. Tanzania is endowed with more than 3,3 million hectares of lands suitable for maize production. Increase in yield is mainly caused by amount of farm inputs, technology and know-how of producer.

Maize is grown all over the country especially in Iringa, Mbeya, Ruvuma, Rukwa, Tanga, Kilimanjaro, Kagera (Biharamulo), Morogoro and in Arusha and Manyara regions. 40% of the national maize production comes from these regions: Small-scale farmers are dominating the maize production in Tanzania. They account for roughly 85 percent of total production. Medium and large-scale farms make up for 10 percent and 5 percent respectively. Although large and modern farms exist, agricultural production in Tanzania remains grounded on subsistence farming.

In the study of Makorere and Mbiha (2012) on determinants of farmers’ income in Tanzania with an empirical evidence of orange farmers in Muheza District, Tanga, four critical factors were found to be the main determinant factors in influencing net cash income out of the twelve examined. These determinant factors of farmers’ income included farm size, number of orange trees at the farm produces oranges, market prices earned and farm output or yield. In all twelve cases examined, four variables together accounted for about 52% of the total variance in income of farmers within a given year. In this Makorere and Mbiha (2012) study, the dependent variable was farmers’ income (Y).

## 2.5 Research Gap

According to URT, 2001, Tanzanian government has been trying to alleviate farmers’ problems through various strategies and programs including Rural Development Strategy (RDS), Agricultural Sector Development Strategy (ASDS), Agricultural Sector Development Program (ASDP) and District Agricultural Development Programs (DADPs). Despite all these development efforts, the rural farmer is still regarded as poor. Moreover, none can state the average income of the rural maize farmer, average output or yield of the rural maize farmer, the average amount of the earned income saved as investment for the coming agricultural season and the notable determinant factors of the rural farmers’ income. However, in Tanzania there has been scanty research conducted on the determinant factors of farmers’ income. The study therefore examined the determinant factors of farmers’ income in Tanzania with empirical evidence of maize farmers in BDC, Manyara, Tanzania.

## **2.6 Conceptual Framework**

The conceptual framework of this study is informed by both the theoretical and empirical literature review and the prevailing local situation in BDC. The determinant factors affecting farmers’ income are informed by the Sustainable Livelihoods Approach (SLA) by IFAD (2012). The econometric model here was constructed with a reference to the factors incorporated in the SLA. The livelihoods assets in the SLA (Social, Financial and economical) are replaced in this study by education level and sources of initial capital. Other variables are adopted from the empirical literature review, specifically marketing system as it was shown by Benjamin and Wilhulssen (2007) and sex and age of the farmer as they are shown by Capri (2008) that age and gender have to be considered when designing mechanisms for deriving farmers’ income. The model in this study also adds other new variables like farm size, experience of a farmer, cost of agricultural inputs and implements, farm output or yield and farm produce.

**POLICY FACTOR**

**Production factors** Labour, Land, Seed, and Fertilizers

**Socio–economic Factors:** Age, gender, Experience,Education

**Institutional factors:** Market, credit, Extension services

Improve maize productivity

Increase household income

Figure 2.1: The Conceptual Framework

**Source:** Adopted and modified from IFAD (2012)

### 2.6.1 The Relationship among the Variables

The dependent variable in the conceptual framework is farmers’ income. It is influenced either positively or negatively by the independent variables. These independent variables were found consequently encouraging or discouraging households from depending on farmers’ income to derive their livelihoods and in the long run, implicate their poverty reduction strategies as related to farming practices or farmers’ income. In the same study, other variables which were considered included age of farmer, experience of farmer, gender of farmer, farm distance (distance to market), education of farmer, cash credit earned and cost of agricultural inputs and implements.

Independent variables in the conceptual framework were the factors that various empirical studies have mentioned to act as intermediate agent or mechanism in influencing farmers’ income. In this study the independent variables used included age of a farmer, education level of a farmer, sex of a farmer, source of initial capital, farm size, experience of a farmer, extension services, cost of agricultural inputs and implements, farm output or yield, farm credit and price of the produce.

**CHAPTER THREE**

# 3.0 RESEARCH METHODOLOGY

## 3.1 Introduction

This is an essential part of the research which covered study area and population, research approach and research design, sample size and sampling techniques, data type and collection methods, data/econometric analysis and model specification. This chapter therefore, presented a systematic analysis of the research techniques used in the study.

## 3.2 The Research Approach and Research Design

The research approach and research design used were quantitative approach and cross-sectional survey respectively. The quantitative approach was employed due to its statistical description of a phenomena or analysis of the statistical relationships. The cross sectional design was used in this study whereas data were taken once for investigation. The cross-sectional study design has an advantage of providing useful data for simple statistical descriptions and interpretations but it has a limitation to capture causal relationship; this is due to the fact that, the researcher cannot manipulate the independent variable to make before and after comparisons. This study solved that problem of limitation by using statistical control method which involved inclusion of other variables in the study like multiple regressions instead of simple linear regression.

## 3.3 The Study Area and Population

The study area was Babati District Council (BDC) which is one of the two Councils in Babati District and one of the seven Councils in Manyara Region. BDC is among of the largest maize producers in Manyara Region. It is located in the North East of Tanzania and lies between the Latitude of 30- 50 South of the Equator and Longitude of 350 – 370 East of Greenwich. It is bordered with the following districts; Monduli in the North, Karatu in the North-West, Mbulu in the West, Hanang in the South-West, Kondoa in the South and Simanjiro in the East. It has an area of 5,609 square Kilometres which is 92.4% of the total area of Babati District (6,069 Sq. Kms).



Figure 3.1: Map of Manyara Region’s Districts

The study population in BDC is projected to have a total population of 358,612 people with 182,300 males and 176,312 females by 2016/2017 financial year. It has a population growth rate of 3.6% with a total of 46,604 households out of 59,853 households engaging in agriculture (URT, 2016). Most of the study populations rely on agricultural practices specifically crop production from which the targeted population of 160 household respondents was drawn from.

## 3.4 Sample Size and Sampling Technique

Purposive sampling technique was used to select a region, District, wards and villages. Purposive technique was used due to the experience of a researcher with Manyara region, District, Wards and villages producing huge volume of maize in the Council. Purposive sampling was used to help the researcher to build trust with the participants in maize production for the researcher had an experience of 6 years with Manyara region and 3 years with District. The idea is supported by Miles and Huberman (1994) who asserted that the research site and sample selection has to consider researcher-participant relationship, participant readiness and freedom to partake in the study.

Simple random sampling was employed to select a sample size of 160 smallholder farmers from which 20 were selected from 8 potential villages producing maize. According to Bailey (1994) a sample or sub sample should at least be 20 cases, in most cases at least 100 cases are taken. Therefore, sample of 160 smallholder farmers or respondents is even higher than minimum as recommended by Bailey for statistical analysis. Also Mwanyika (2000) contented that a sample to be representative of the population should not be less than 5% of the population under study. As well Kothari (2004) argued that if the stuff of the population is homogeneous regardless of the population size a sample of at least 100 cases is sufficient.

## 3.5 Data Type and Collection Methods

The study employed different methods in data collection, whereby both primary and secondary data were used. Closed and open-ended questionnaires were tools used to collect primary data while secondary data were collected through documentary review from different institutional reports.

## 3.6 Data and Econometric Analysis

The dependent variable in this study was the farmers’ income. It was noted to be either positively or negatively influenced by the independent variables, which were consequently found encouraging or discouraging households from depending on farm activities to derive their income (livelihoods) and in the long run, implicate their poverty reduction strategies as related to household farmers’ income.

Table 3.: Variables and Measurements

| **Variable name** | **Variable type** | **Operational definition** | **Measurement** | **Expected prior sign** | **Source of Data** |
| --- | --- | --- | --- | --- | --- |
| Farm income | Continuous | Money income from farm practices | Tanzanian Shillings |  | Questionnaire |
| Age of a farmer | Continuous | Number of years of farmer | Ration Scale | Positive | Questionnaire |
| Education level | Categorical | Yes or No | Ordinal Scale | Positive | Questionnaire |
| Capital used | Categorical | Numeric | Nominal Scale | Positive | Questionnaire |
| Farm size | Categorical | Numeric | Nominal Scale | Positive | Questionnaire |
| Extension Services | Categorical | Yes or No | Nominal Scale | Positive | Questionnaire |
| Agricultural inputs | Categorical | Yes or No | Nominal Scale | Positive | Questionnaire |
| Experience of a farmer in terms of years | Categorical | Numeric | Nominal Scale | Positive | Questionnaire |
| Price of the produce | Categorical | Numeric | Nominal Scale | Positive | Questionnaire |
| Farm yield/produce | Categorical | Numeric | Nominal Scale | Positive | Questionnaire |
| Marketing cost | Categorical | Numeric | Scale | Negative | Questionnaire |

**Source:** Own Design, 2016

Independent variable in this study comprised of age of a farmer, education level, capital used, farm size, extension services, agricultural inputs, experience of a farmer in terms of years, farm yield/output, price of the produce and marketing cost. These independent variables were regressed against dependent variable to obtain the results which were explained depending on its sign of positivity or negativity. For the variables in operation definition with ‘yes’ means it has positive contribution to yield which lead to increase in income while for those with “no” means contributes negatively, while for those with “yes” and “no” they may contribute positive or negatively.

## 3.7 Data Analysis

This analysis involved the use of various measures of central tendency. It involved descriptive analysis which included calculation of frequencies, percentages and means and presenting them in tabular forms. Raw data collected were coded into SPSS template from which all variables ware interred then data cleaning was done to make sound information. Data collected were analyzed using component of regression through SPSS version 20. This research work used different model fits to test the validity of data. These included test of multicollinearity and coefficient of determination (R2). These two-tests found linear regression model useful. Due to these reasons, linear regression was used.

## 3.8 Model Specification

This model relied on production theories which explain the input output relationship during production. The production theory uses regression model equation in determining the contribution of factors of production to the farmers’ income, were all factors used by farmers in maize crop production defined in the equation 1 as shown;

Y = β0 + β1X1 + β2X2 + β3X3 + β4X4 + β5X5 + β6X6 + β7X7 + β8X8 + β9X9 + β10X10 + ε

Whereby:

Y is the farmers’ income,

X1 to X10 are the determinant factors that influence farmers’ income

β0 refers to slope of the equation or Constant coefficient,

ε refers to stochastic error term or other determinant factors,

β1 to β10 refer to coefficients of determinants,

And these 9 independent variables included:

X1 – Age of a farmer – Number of year living in the place

X2 – Level of education-Number of year of schooling

X3 – Capital used – Investment injected in maize farm in Tanzanian Shillings

X4 – Farm size- Land (acre) cultivated per year

X5 – Extension services- frequency of meeting with farmers

X6 – Agricultural Inputs- Dummy variable 1. Yes and 0 otherwise

X7 – Experience of a farmer in terms of years- Number of years engaged in maize growing

X8 – Farm Yield/output- produce of maize from one acre

X9 – Price of the produce – maize selling price per kg

X10 – Marketing cost–in Tanzanian shillings.

# **CHAPTER FOUR**

# 4.0 RESULTS AND DISCUSSION

## 4.1 Farmers Social Economic Characteristics

Social economic statistic of the survey is found in table 3, the survey achieved to interview 160 farmers among them 127 (79.4) males and 33 (20.6) females, the finding showed that farmers household has 7 average people, 1 is smallest family while 17 is large family size. Most family’s member has mean age of 42 year but the age ranges from 21 to 83 years old. The results revealed that an average of 2.3 acres is used for maize production out of an average of 3.0 acres of total land owned by households. In BDC farmers harvest maize on average of 12.8 bags per acre

Table 4.: Farmers Social Economic Characteristics

|  |  |
| --- | --- |
| Variable | Mean value |
| Farmers age | 42 Year (Min 21, Max 83) |
| Farmer household size | Av 6.8 (Min 1, Max 17) |
| Maize farm size | Av 2.3 (Min 0.25, Max 10) |
| Total farm size | Av 3.0 (Min 0.25, Ma 15) |
| Maize yield/acre | Av 12.8 (Min 3, Max 40) |
| Gender (Males127, Females 33) | * 1. Male, 20.6 Females |

**Source:** Research Data, 2016

### 4.1.1 Education of Respondents

From the findings 90% of famers have attained primary education level. While 5% and 1.2% have attained secondary O-level and A- level respectively, and 3.8% have no formal education. Generally, most of respondent attended school, they have an exposure and ability to understand and use improved technologies that can lead to high productivity and income. Amani et al. (2005) observed the importance of education being more than other factors in determining adoption of technology in agriculture and it contributes to total outputs in Tanzania.

Table 4.: Education of Respondents

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Specification | Villages | | | | | | | | Total |
| Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng'war | Long | Walahu |
| None | Count | 0 | 0 | 1 (0.6%) | 21.2 | 3 | 0 | 0 | 0 | 6 |
|  | % of Total | 0.0% | 0.0% | 0.6% | 1.2% | 1.9% | 0.0% | 0.0% | 0.0% | 3.8% |
| Primary | Count | 20 | 17 | 19 | 18 | 14 | 20 | 16 | 2 | 144 |
|  | % of Total | 12.5% | 10.6% | 11.9% | 11.2% | 8.8% | 12.5% | 10.0% | 12.5% | 90.0% |
| Secondary-O level | Count | 0 | 3 | 0 | 0 | 1 | 0 | 4 | 0 | 8 |
|  | % of Total | 0.0% | 1.9% | 0.0% | 0.0% | 0.6% | 0.0% | 2.5% | 0.0% | 5.0% |
| Secondary A-level | Count | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
|  | % of Total | 0.0% | 0.0% | 0.0% | 0.0% | 1.2% | 0.0% | 0.0% | 0.0% | 1.2% |
|  | Count | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 160 |
|  | % of Total | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 100.0% |

**Source:** Research Data, 2016

## 4.2 Factors that Influence Household Maize Production

The result of the study revealed that farm size, marketing cost, yield, education level, capital invested and use of improved agricultural inputs were the major factors affecting household maize production. All these factors were found with significant levels of 1%, 5% and 10% as table 4.7 indicated after analyzing through linear regression model. Thus, the null hypothesis is rejected and alternative hypothesis is accepted as farm size, marketing cost, farm yield, education level, capital invested and use of agricultural inputs were found major factors affecting household maize production in Babati District Council with significant levels of 1%, 5% and 10%. Moreover, farmers in BDC used to participate in different activities as the source of income in the household. The result shows that crop production and livestock keeping were the major employment carrying 76.2% and 23.8% respectively as table 4.3 indicate.

Table 4.: Major Types of Employment

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Specification** | **Village of respondent** | | | | | | | | **Total** |
| **Arri** | **Tsaayo** | **Dudiye** | **Utwari** | **Madunga** | **Gidng'war** | **Long** | **Walahu** |
| Agriculture- Crop | Count | 17 | 16 | 16 | 15 | 16 | 14 | 15 | 13 | 122 |
| % within Major1 types of employment | 13.9% | 13.1% | 13.1% | 12.3% | 13.1% | 11.5% | 12.3% | 10.7% | 100.0% |
| % within Village of respondent | 85.0% | 80.0% | 80.0% | 75.0% | 80.0% | 70.0% | 75.0% | 65.0% | 76.2% |
| Agriculture- Livestock | Count | 3 | 4 | 4 | 5 | 4 | 6 | 5 | 7 | 38 |
| % within Major1 types of employment | 7.9% | 10.5% | 10.5% | 13.2% | 10.5% | 15.8% | 13.2% | 18.4% | 100.0% |
| % within Village of respondent | 15.0% | 20.0% | 20.0% | 25.0% | 20.0% | 30.0% | 25.0% | 35.0% | 23.8% |
| Total | Count | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 160 |
| % within Major1 types of employment | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 100.0% |
| % within Village of respondent | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Source:** Research Data, 2016

**4.3 Different Crop Competition as the Sources of Income in the Household**

Maize is the major food and commercial crop grown around all villages in BDC but it faces with high competition with other commercial crops like garlic, pigeon peas, Irish potatoes and beans. Different crops in different villages have different motivated condition like weather and soil condition. Maize farming is practiced in all villages surveyed but it faces with different competition with other crop in different villages like garlic, irish potatoes, beans and sweet potatoes in Madunga, Gidng’war and Utwari while pigeon peas is the greater competitor of maize in Arri, Tsaayo and Dudiye.

Amongst all villages’ produce (Maize, Beans, pigeon peas, garlic, irish potatoes and sweet potatoes), maize is the major crop produced in all 8 villages surveyed (Arri, Tsaayo and Dudiye, Utwari, Madunga, Gidng’war, Long and Walahu). Furthermore, maize is mostly intercropped with beans. Walahu was a leading among maize produced village (41.7) followed by Tsaayo, Dudiye and Arri with 39.2%, 38.0% and 37.7% respectively, while pigeon peas was the greater competitor of maize with 32.0%, 21.6% and 24.5% levels of competition for Dudiye, Tsaayo and Arri. Pigeon pea was found to be the second crop source of the household income after maize. Beans is not cultivated as sole crop but used to cultivate by intercropping with maize at the same time with pigeon pea.

Garlic, irish potatoes and sweet potatoes were other sources of farmer’s income in villages of Gidngwar, Madunga and Utwari, Long and Walahu respectivelly, Analysis results indicated that garlic is highly produced in Gidng’war by 32.7% compared to production of other crop produced while the rest produced by 31.7%, 28.8% for Madunga and Utwari villages respectively. This production is small less compared to maize production. Long village observed to lead in irish potatoes production, it had 23.6% of irish potatoes among all surveyed village. It was followed by Madunga, Gidng’war, Utwari, and Walahu by 18.3%, 10.9%, 6.8% and 4.2% respectively.

Sweet potatoes were found among of crop produced in Babati district with production levels of about 12%, 8.3%, 6.7%, 3.4% and 1.8% of total production for Long, Walahu, Madunga, Utwari and Gidng’war villages respectively. In general farmers earned more income from maize by 36.9%, Beans 26.9%, Garlic 12.5%, Pigeon peas 9.7%, Irish potatoes 8.4%, sweet potatoes 4.2% and lastly green peas by 1.4%.

Table 4.: Major Crops Grown

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Village | | | | | | | | Total |
| Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng’war | Long | Walahu |
| Maize | 20 (12.6%) | 20 (12.6%) | 19 (11.9%) | 21 (13.2%) | 20 (12.6%) | 20 (12.6%) | 19 (11.9%) | 20 (12.6%) | 159 |
| Beans | 20 (17.2%) | 20 (17.2%) | 15 (12.9%) | 15 (12.9%) | 4 (3.4%) | 10 (8.6%) | 12 (10.3%) | 20 (17.2%) | 116 |
| Pigeon pea | 13 (31.0%) | 11 (26.2%) | 16 (38.1%) | 0 | 0 | 0 | 0 | 2 | 42 |
| Irish potato | 0 | 0 | 0 | 4 (11.1%) | 11 (30.6%) | 6 (16.7%) | 13 (36.1%) | 2 (5.6%) | 36 |
| Green gram | 0 | 0 | 0 | 0 | 2 (33.3%) | 0 | 4 (66.7%) | 0 | 6 |
| Garlic | 0 | 0 | 0 | 17 (31.5%) | 19 (35.2%) | 18 (33.3%) | 0 | 0 | 54 |
| Total | 12.3% | 11.8% | 11.6% | 13.7% | 13.9% | 12.8% | 12.8% | 11.1% | 100 |

**Source:** Research Data, 2016

## 4.4 Factors Affecting Income Differentiation among the Rural Maize Farmers

Farm income on this research determined more by different factors among the rural maize farmers. According to this research farm size and farm yield are the greatest factors influencing farmers’ income as they have significant levels of 1% which is much higher compared to other parameters. The study of farm land expansion and not use of agricultural technologies concur with the study done by Goni *et al.,* (2007) who reported that, most smallholder farmers fail to maximize yields due to underutilization of farm land. They further argued that limited availability of other production factors seems to be the reason for the underutilization of land available for production.

Moreover, the research observed different farmers’ income between illiterate and literate farmer. Education which is significant at 10% significant level indicates importance of variable in farmer’s income and can well be integrate during policy making. Education has greater contribution on farmer’s income generation from maize farming therefore in order for Tanzania maize farmer to progress from one steps to another, the government should prioritize on farmers’ education. The results found in this study is similar with the research conducted by Amani *et al.* (2005), who contended that formal education is likely to increase farm level efficiency.

Input (0.105), experience (0.177) observed to have positive determinant of farmer income which is significant at 5 percent level of significant for both it indicates that if 10 percent increase in input and experience farmer income will rise by 10.5% and 17.7%. In all village surveyed almost all maize farmers were using improved input as well as Farm Yard Manure (FYM) and few farmers complimented FYM with industrial fertilizer. Experience increase farmers’ income this is due to the experienced farmers countered with different challenge during farming activities therefore they have know how knowledge to overcome challenge compared to those farmers who has minimal experience.

Capital invested in farming activities has greater impact on maize yields, it observed that most farmers use hired oxen during farm preparation, the use of animal traction make farmer to optimize the farming season compared to those who use hand hoe. The research found that 1 percent increase in capital injected in maize farming, farmer income raise by 0.073 percent as well capital variable is significant at 10 % level of significant.

Price and yield observed to have positive sign which suggest that percent increase in price farmers’ income will increase by 0.032 while a percent increase in yield farmer income will increase by 0.497, yields observed to significant at 1% but price is insignificant. Though age has negative sign (-0.076) but it is significant at ten percent. From the study, therefore, the null hypothesis is rejected and the alternative hypothesis is accepted for the reason that there is significant influence of farm size, level of education, use of agricultural inputs, experience of a farmer and capital invested onto income differentiation among rural maize farmers at significant level of 1%, 5% and 10% as stipulated in table 4.7.

## 4.5 Factors Affecting Farmers’ Income

### 4.5.1 Model Fit

In this study, the coefficient of determination (R2) is an important tool in determining the degree of linear-correlation of variables ('goodness of fit') in regression analysis, the higher the value, the better the fit, in this study R2 observed to 0.724 which indicates that the model used explain well the variation in the dependent variable as well adjusted R2 is 0.709. Since, these two measures of model fit, R2 and adjusted R2 have large number, thus the model well fits to be used in the analysis.

Table 4.5: Measure of Model Fit as Tested by R2 and Adjusted R2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | R | R2 | Adjusted R2 | Std. Error of the Estimate | Durbin-Watson |
| 1 | .851a | .724 | .709 | 545217.782 | 1.782 |

**Source:** Research Data, 2016

The Durbin Watson is another the statistical test used to test for autocorrelation in the residuals from a statistical regression analysis, Durbin Watson statistic is always between 0 and 4. The value of 2 indicates that there is no autocorrelation in the sample. Values approaching 0 indicate positive autocorrelation and values toward 4 indicate negative autocorrelation while a value of 2 indicate no autocorrelation, this study observed to have 1.78% rounded to 2% this means that there is no autocorrelation at 1 percent significant level. (Green H, 2002).

Model fit also include multicollinearity test which is measured through VIF, test shows that there is no any problem in the variable used in the model, VIF should not exceed 5, most of the variable results observed to have the value of one and two variable age and experience show value of 3. These results mean linear regression is the proper regression method to use in this study.

Table 4.6: Measure of Model Fit Multicollinearity Test

| **Model** | **Tolerance** | **VIF** |
| --- | --- | --- |
| Age | 0.264 | 3.788 |
| Education | 0.827 | 1.208 |
| Capital | 0.978 | 1.022 |
| land size | 0.938 | 1.066 |
| Extension services | 0.874 | 1.144 |
| Inputs | 0.868 | 1.153 |
| Experience | 0.251 | 3.985 |
| Average price | 0.961 | 1.041 |
| Average yield (bags/acre) | 0.843 | 1.187 |

**Source:** Research Data, 2016

### 4.5.2 Factors Influencing Farmers’ Income

In most of literature where agricultural is viable, production theory has been an average measure of the efficiency for higher productivity. Productivity is explained as the ratio of output per inputs used in the production process (Nicholson and Snyder, 2008). The total productivity is the measure of economic values that determines the income of individual when the unit output is sold. In discussing factors that affecting farmers’ income, the researcher decided to use ten variables which includes age of a farmer, level of education, capital invested, farm size, extension services, inputs, experience of farmers, price of output, yield and marketing cost to provide information about factor affecting farmers’ income.

According to the results it was observed that farmers’ income is affected in two ways namely; positive way and negative way. Variable which influence farmers’ income in positive way including education, capital, farm size, experience, yields, price, and inputs, while factors which influence farmers’ income in negative way including age, Extension services and marketing cost. Education has positive coefficient of 0.009 which mean one unit increase education, farmers income will increase by 0.009 this is due to the fact that farmers have knowledge of use of different kinds of input like fertilizer, improved seed as well as easy adoption of different improved technologies.

Capital invested in terms of fertilizer, improved seed and many other different improved technologies during farming process observed to have positive impact on farmer’s income. Results show that one person increase as farm investment capital farmer income will increase by 0.073% which is significant at 10%. Most farmers in developing countries like Tanzania relies much on farm expansion instead of technologies when want to increase yield production (Nakano et al., 2010), this concern is related with this study, the study shows that one unit increase in farm size also yield will increase by 0.84 units and the factor farm size observed to have a significant of 1% level. Moreover, price of output/yield is the basic determinant of production, in many economic theories like Cob web theorem. Once if the last price was attractive farmers tend to cultivate more by using different improved technologies. This theory is support by the study in the sense that 1% increase in price farmer’s income will increase by 0.032%.

The study shows that experience of a farmer in maize farming has a positive sign which imply that a person with many years in maize farming has significance of earning more income than none experienced one. This had proven by findings which revealed a coefficient of 0.177 which means that if experience in maize farming increase by 10% farmers’ income will increase by 17%. There are three negative factors affecting farmers’ income which are age, extension services and marketing cost. Age affect negatively farmers’ income due to the negative coefficient (-0.146) that observed, 1 percent increase in age, farmers’ income decrease by 0.146 this can be due to inability of elder to concentrate on farming activity.

Extension staff has also negative coefficient (-0.056) which show that extension personnel are not in the place or availability of agriculture personnel are not main factor but the commitment and quality of personnel. Likewise Marketing cost has negative coefficient which means that a percentage increase in marketing cost decreases farmer’s income by 0.042 and it is significant at 5%. Furthermore, a percentage increase in maize yield, farmer’s income will increase by 0.497% as this variable is highly significant at 1% level. The explanatory liner regression model can thus be written as here under:

Y = 235061.31– 13113.51X1 + 23288.13X2 +0.904X3 +548617.55X4– 116779.561X5 +363816.894X6 + 13925.619X7 + 87490.213X9 – 34350.639 X10

Table 4.7: Factors Affecting Farmer’s Income

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
|  | B | Std. Error | Beta |
| (Constant) | 235061.309 | 516203.851 |  | 0.455 | 0.650 |
| Age (X1) | -13113.514 | 7339.201 | -0.146\*\* | -1.787 | 0.076 |
| Education (X2) | 23288.134 | 128616.613 | 0.009\*\* | 0.181 | 0.057 |
| Capital (X3) | 0.904 | 0.559 | 0.073\* | 1.618 | 0.108 |
| Farm size (X4) | 548617.550 | 28932.342 | 0.835\*\*\* | 18.962 | 0.000 |
| Extension services (X5) | -116779.561 | 94736.258 | -0.056 | -1.233 | 0.220 |
| Inputs (X6) | 363816.894 | 162239.657 | 0.105\*\* | 2.242 | 0.026 |
| Experience (X7) | 13925.619 | 6602.790 | 0.177\*\* | 2.109 | 0.037 |
| Price (X8) | 7.998 | 10.810 | 0.032 | 0.740 | 0.461 |
| Yield (X9) | 87490.213 | 4243.439 | 0.497\*\*\* | 20.618 | 0.000 |
| Marketing cost (X10) | -34350.639 | 19318.366 | -0.042\*\* | -1.778 | 0.077 |

\*Indicates significant level, \*\*\*, \*\*,\*= 1%, 5%, 10% respectively

Basing on the stated null and alternative hypothesis, the study rejects null hypothesis and accepts alternative hypothesis as it indicated that there is significant influence of education level, capital invested, farm size, farm yield, use of improved agricultural inputs and farmer’s experience onto farmer’s income as stipulated in Table 4.7.

**CHAPTER FIVE**

# 5.0 CONCLUSION AND RECOMMENDATION

## 5.1 Conclusion

Explicitly the study examined the factors influencing smallholder farmer’s net income in BDC. The results revealed that through a stepwise multiple regression analysis, 8 out of 10 factors examined were the main factors affecting farmer’s income as evidenced by significant levels of 1%, 5% and 10%. These were: Age of a farmer, Level of education, Capital used, Farm size, use of improved agricultural inputs, Experience of a farmer, Farm output/yield and the factor marketing cost. In all ten cases examined account for about 72.4% of the total variance in farmers’ income within a given year. The results show that on average every smallholder maize farmer statistically found to earn net farm income of TZS 1,159,913as seen in appendix 13.

## 5.2 Recommendation

The results implies that farm size, farm yield, education level, experience, marketing cost, age, capital invested and use of improved agricultural inputs are factors affecting farmer’s income with significant levels of 1%, 5% and 10%. The researcher’s recommendation is that the government should proceed with provision of sound policy that make capital and credit facilities more accessible to rural farmers and change of mind to agricultural extension staff is highly demanded to serve farmers in maize farming practices and hence resulting into increase of maize farmer’s income.

REFERENCES

Acharya, S. (2011). Making unilateral trade liberalization beneficial to the poor. *Socio - Economic Planning Sciences* 45(2): 60-71.

Acharya, S., & Cohen, S. (2008). Trade liberalization and household welfare in Nepal *Journal of Policy Modeling 30*(6): 1057-1060.

Adebayo, A. F. (1985). The implications of community leadership for Rural

Achterbosch, T., & Roza, P. (2007). Diversity of impact: Agricultural trade liberalization, poverty and development. Project code 20668, January 2007, Report 6.07.04, LEI The Hague.

Adams (Jr), R. H. (2001). Non-farm income, inequality and poverty in rural Egypt and Jordan. Policy Research Working Paper 2572. World Bank, Washington, D. C.

Adams (Jr), R. H. & He, J. J. (1995). Sources of income inequality and poverty in rural Pakistan. Research Report No. 102. International Food Policy ResearchInstitute, Washington, D.C.

Adebayo, A. F. (1998). An evaluation of public policies for rural development in Nigeria, Geo Res.1(1): 65-73.

Adeoti, J. O., & Sinh, B. T. (2009). Technological constraint and farmers' vulnerability in selected developing countries (Nigeria and Vietnam). Paper presented at the 7th International Conference on ‘Inclusive Growth, Dakar: Senegal.

Akinrinola, O. O., & Mafimisebi, T. E. (2004). The Nexus between institutional attributes of formal institutional credit sources and credit acquisition: Empirical evidence from small scale farmers in southwest, Nigeria. *Journal of Food, Agriculture and Environment*, 5(1):(in press).

Amani, H. K. R., Mabele, R. B., Rugumisa, S. & Msambichaka, L. A. (2005). Agricultural in economics stabilization policies perspectives, in economics stabilization policies in Tanzania, pp. 112-127. Edited by Lipumba, H. I., Msambichaka, L. A. and Wangwe S. M. Economic Department and Economic Bureau, Dar es Salaam, Tanzania.

Annabi, N., Khondoker, B., Raihan, S. & Decaluwe, B. (2006). Implications of WTO agreements and uniteral trade policy reforms for poverty in Bangladesh: short versus long-run impacts. World Bank Policy Research Working Paper 3976, Washington DC: the World Bank.

Bailey, D. K. (1994). *Methods of social research (4th ed.).* London, The Free Press Collie Macmillan Publisher.

Baha, R. M. (2013). Sources of technical efficiency among smallholder maize farmers in Babati district, Tanzania. *International Journal of Africa and Asia studies.* Vol. 1(8): 1-8.

Barrett, C. B., Reardon, T., & Webb, P. (2001). Non-agricultural income diversification and Household livelihood strategies in rural Africa: Concepts, dynamics and policy implications. *Food Policy,* 26(4): 315-331.

Bezemer, D. & Headey, D. (2008). Agriculture, development and Urban bias. *World Development,* 36(8): 1342-1364.

Birthal, P. S. & Singh, M. K. (1995). Structure of rural income inequality: A study in western Uttar Pradesh. *Indian Journal of Agricultural Economics,* 50(2): 168-175.

Blaug, M. (2007). The fundamental theorems of modern welfare economics, historically contemplated. *History of Political Economy* 39(2): 185-208.

Bliss, C. (1987). The new trade theory and economic policy. *Oxfrod Review of Economic Policy* 3(1): 20-36.

Byerlee, D., Diao, X. & Jackson, C. (2005). *Agriculture, rural development, pro-poor growth: country experience in the post-reform era*. Agricultural and Rural Development Discussion Paper 21, Washington DC: the World Bank.

Chand, R., Prasanna, P. A. L. & Singh, A. (2011). Farm size and productivity: Understanding the strengths of smallholders and their livelihoods. *Economic and* *Political Weekly,* 54(26/27): 5-11.

Chaudhry, I. M., Malik, S. & Ashraf, M. (2006). Rural poverty in Pakistan: Some related concepts, issues and empirical analysis. *Pakistan Economic and Social Review,* 44(2): 259-276.

Cassel, A. & Patel, R. (2003). *Agricultural trade liberalization and Brazil's rural poor: Consolidating inequality*. New York: Global Policy Forum.

Chang, R., Kaltani, L. & Loayza, N. V. (2009). Openness can be good for growth: The role of policy complementarities. *Journal of Development Economics* 90(1), 33-49.

Chiquiar, D. (2008). Globalization, regional wage differentials and the stolper-samuelson theorem: evidence from Mexico. *Journal of International Economics,* 74(1), 70-93.

Collier, P. Radwan, S. W. (1992). Labour and poverty in rural Tanzania, ujamaa and rural development, Tanzania. pp. 15-20

Collier, P., Radwan, S. & Wangwe, S. (1986). *Labor and poverty in rural Tanzania*. Oxford Calarendon Press.

Coppard, D. (2001). *The rural non-farm economy of India: A review of the literature*. NRI Report No. 2662. Natural Resources Institute, London, U.K

Dabalen. A., Paternostro, S. & Pierre, G. (2004). The returns to participation in non-farm sector in Rwanda. Policy Research Working Paper 3462. World Bank,Washington, DC

Daniel, F. J. & Perraud, D. (2009). The multifunctionality of agriculture and contractual policies. A comparative analysis of France and the Netherlands. *Journal of Environmental Management, 90*(Supplement 2): 132-138.

Datt, G. & Ravallion, M. (1996). Why have some Indian states done better than others at reducing poverty. Policy Research Working Paper 1594. World Bank, Washington, D.C.

Davis, B., Winters, P., Carletto, G., Covarrubias, K., Quinones, E., Zezza, A., Stamoulis, K., Bonomi, G. & DiGiuseppe, S. (2007). Rural income generating activities: a cross country comparison. ESA Working Paper No. 07-16. Agricultural Development Economics Division, Food and Agriculture Organization, Rome.

de Janvry, A., Sadoulet, E. & Zhu, N. (2005). The role of non-farm incomes in reducing rural poverty and inequality in China. Working Paper 1001. Department of Agricultural & Resource Economics, University of California, Berkley. Available at http:// repositories.cdlib.org/are\_ucb.

DFID (2004). *Agricultural trade and poverty reduction: Opportunity or threat?* London: Department for International Development (DFID).

Durlauf, S. N., Kourtellos, A. & Tan, C. M. (2008). Are any growth theories robust? *The Economic Journal,* 118(527), 329-346.

FAO/Kilimo, (1995). Identification for social economic constrains for agriculture production. *Sokoine University of Agriculture, Morogoro, Tanzania,* pp. 18-21.

Gabre-Madhin, E., Barrett, C. B. & Dorosh, P. (2002). *Technological change and price effects in agriculture: Conceptual and comparative perspectives*. Washington DC: International Food Policy Research Institute (IFPRI).

Gerard, F. & Piketty, M. G. (2007). Impact of agricultural trade liberalisation on poverty: Sensitivity of results to factors mobility among sectors. Paper presented at the 106th seminar of the EAAE 'Pro-poor Development in Low Income Countries: Food, Agriculture, Trade, and Environment' held on 25-27 October 2007, Montpllier, France.

Goni, M., Mohammed, S., & Baba, B. A. (2007). Analysis of resource-use efficiency in rice production in the Lake Chad area of Borno state, Nigeria. *Journal of Sustainable Development in Agriculture and Environment*, 1(3): 31-37.

Greenwald, B. C. & Stiglitz, J. E. (1986). Externalities in economics with imperfect information and incomplete markets. *Quarterly Journal of Economics (98):* 101, 229-246.

Green, H. W. (2002). *Econometric analysis* (5th ed.). New York: University 268-270

Henry, M., Kneller, R. & Milner, C. (2009). Trade, technology transfer and national, efficiency in developing countries. *European Economic Review* 53(2): 237-254.

Hella, J. P. & Yona, G. (1999). Cash income generation and expenditure allocation characteristics in smallholder farming system: case study of mufindi district, Agricultural Productivity and Sustainability in Developing Countries: Strategies, Achievements and Constraints. *Agricultural Economics Society of Tanzania, Morogoro, Tanzania, 1(2): 30 – 35.*

Hougane, A. (2000). Mozambique General Background Information. IFAD (2012). Annual Report:Enabling poor rural people to overcome poverty*.* Rome, Italy: Oxford University Press for International Fund for Agricultural Development.

Keleman, A. (2010). Institutional support and in situ conservation in Mexico: biases against small-scale maize farmers in post-NAFTA agricultural policy. *Agriculture and Human Values* 27(1), 13-28.

Keynes, J. M. (1936). *The general theory of employment, interest, and money.* London: Macmillan.

Kilama, B., & Wuyts, M. (2014). *The changing economy of Tanzania: patterns of accumulation and structural change.* (REPOA, Ed.) (14/3 ed., Vol. 14/3).Dar es salaam, Tanzania: REPOA.

Kong, T. (2007). A selective review of recent developments in the economic growth literature. *Asian-Pacific Economic Literature,* 21(1): 1-33.

Kothari, C. R. (2004). *Research methodology*. New Delhi, New Age International Publishers.

Kuwornu, K. M., Demi, M. S. & Ditchfield, P. A. (2013). Analysis of food security status of farming households in the forest belt of the central region of Ghana. *Russian Journal of Agricultural and Socio-Economic Sciences,* 1(13):17-18.

Krugman, P. R. & Obstfeld, M. (2006). *International economics: Theory and policy*. New York: Addison-Welsley.

Lanjouw, P. & Shariff, A. (2002). Rural non-farm employment in India: Access, income and poverty impact. Working Paper 81. National Council of Applied Economic Research, New Delhi.

Lanjouw, P. (1999). Rural non-agricultural employment and poverty in Ecuador. *Economic Development and Cultural Change,* 48(1): 91-122.

Lanjouw, P. & Stern, N. (1993). *Agricultural change and inequality in Palanpur. In:* *The Economics of Rural Organization: Theory, Practice and Policy,* Eds: A. Braverman, K. Hoff, and J. Stglitz. Oxford, University Press.

Lyatuu, E. T., Nie, F., & Fang, C. (2015). Economic growth beyond structural transformation in Tanzania: Small and vulnerable economy. *International Journal of Developing and Emerging Economics,* 3(June): 1 – 23.

Mas-Colell, A., Michale, D. W., & Green, J. R. (1995). *Microeconomic theory*. New York, Oxford University Press.

Mafimisebi, T. E., Okunmadewa, F.Y.& Oluwatosin, F. M. (2004). Risks management and administration in crop enterprises by the Nigerian Agricultural Insurance Scheme in Oyo State, Nigeria. *The Ogun Journal of Agricultural Sciences,* 3(1): 26-44.

McCulloch, N., Winters, L. A. & Cirera, X. (2003). *Trade liberalization and poverty: A handbook*. London: Centre for Economic Policy Research.

Makorere, R. & Mbiha, E. (2012). Determinants of farmers’ income in Tanzania: Empirical evidence orange farmers n Muheza District, Tanga region.

Matlon, P. J. (1979). The size contribution, structure and determinants of personal income among farmers in the North of Nigeria. Unpublished Ph.D Dissertation, cornet University, New York.

Meijerink, G. & Roza, P. (2007). The role of agriculture in development. Markets, Chainsand Sustainable Development Strategy and Policy Paper, No. 4, Stichting DLO: Wageningen.

Mendola, M. (2007). Agricultural technology adoption and poverty reduction: A propensity-score matching analysis for rural Bangladesh. *Food Policy* 32(2007): 372-393.

Miles, B. & Huberman, M. (1994). *Qualitative data analysis*: An expanded sourcebook, (2nd ed.), Newbury Park.Sage Publications’ CA.

Nakano, Y. & Kajisa, K. (2010). The determinant of technology adoption. The case of the rice sector in Tanzania. 92 pp.

Narayanan, B. G., Hertel, T. W. & Horridge, J. M. (2010). Disaggregated data and trade policy analysis: The value of linking partial and general equilibrium Models. *Economic Modelling* 27(3): 755-766.

Nissanke, M. & Thorbecke, E. (2007). Linking globalization to poverty. Policy Brief, No 2, UNU-WIDER.

Oberoi, H. & Singh, A. (1980). *Migration, remittances and rural development*, pp. 20-25. Punjab, The Free Press.

Olaitan, S. O. (2000). *Agricultural education in the Tropics*. Hong Kong, Macmillan Publishers.

Olawepo, R. A. (2010). “*Determining rural farmers’ income: A rural Nigeria experience*”, Accessed 04th May, 2011 on http://www.academicjournlas.org/ JASD.

Olayemi, J. K. (1999). The need to mobilize savings among nontraditional users of the banking industry. Pp 1-5. In: Mobilization of Savings among Non-Traditional Users of the Banking Industry in Nigeria. V. O.

Olatona, M. O. (2007). Agricultural production and farmers’ income in Afon district. Unpublished B.Sc. Project, Department of Geography, University of Ilorin.

Orden, D. (2006). Gainers losers from agricultural trade liberalization. *Review of Agricultural Economics* 28(3): 378-380.

Popli, G. K. (2010). Trade liberalization and the self-employed in Mexico. *World Development* 38(6): 803-813.

Pyakuryal, B., Roy, D. & Thapa, Y. B. (2010). Trade liberalization and food security in Nepal. *Food Policy* 35(1): 20-31.

Rakotoarisoa, M. A. (2011). The impact of agricultural policy distortions on the productivity gap: Evidence from rice production. Food Policy 36(2), 147-157.

Ravallion, M. (2004). *Pro-poor growth: A primer*. Development Research Group, Working Paper 3242, Washington DC: the World Bank.

Reardon, T., Stamouis, K., Balisacan, A., Cruz, M. E., Berdegue, J. &Banks, B. (1998). *Rural non-farm income in developing countries*. In: FAO (ed.). *The State of Food and Agriculture 281*-356. FAO, Rome.

San Vicente Portes, L. (2009). On the distributional effects of trade policy: Dynamics of household saving and asset prices. *The Quarterly Review of Economics and Finance* 49(3): 944-970.

Sen, A. (1994). Rural labour markets and poverty. *Indian Journal of Labour Economics,* 37(4): 575-607.

Sexton, R. J., Sheldon, I., McCorriston, S. & Wang, H. (2007). Agricultural trade liberalization and economic development: The role of downstream market power. *Agricultural Economics* 36(2): 253-270.

Stiglitz, J. E. & Charlton, A. (2007). *Fair trade for all: How trade can promote development*. New York: Oxford University Press.

Stone, S. F., Shepherd, B. (2011). Dynamic gains from trade: The role of intermediate inputs and equipment imports. OECD Trade Policy Working Paper No. 110.

Thirtle, C., Irz, X., Lin, L., McKenzie-Hill, V.*,* et al. *(*2001). Relationship between changes in agricultural productivity and the incidence of poverty in developing countries. DFID Report No.7946 27/02/2001.

Todaro, M. P. (2000). *Economic development* (7th ed). p. 170, Addison Wesley.

Topalova, P. (2010). Factor Immobility and Regional Impacts of Trade Liberalization: Evidence on Poverty from India. IMF Working Paper WP/10/218, International Monetary Fund (IMF).

Tooke, T. (1844). *An inquiry into the currency principle*. London: Longman, Brown, Green, and Longmans.

Tribe, M., Nixson, F. & Sumner, A. (2010). *Economics and development studies*. London: Rutledge.

Ruda, C. (2007). Stagnation or transformation of a dual economy through endogenous productivity growth. *Cambridge Journal of Economics* 2007(31): 711-741.

Susila, W. R., Bourgeois, R. (2008). Effect of trade and growth on poverty and inequality: empirical evidences and policy options. *Forum Penelitian Agro Ekonomi* 26(2): 71-81.

URT, (2016). 2012 Population and Housing Census, Basic Demographic Profile, Manyara Region.

URT, (2016). *National Five Year Development Plan 2016/17 – 2020/21, “Nurturing Industrialization for Economic Transformation and Human Development”*.

Valenzuela, E., Ivanic, M., Ludena, C. & Hertel, T. W. (2005). Agriculture Productivity Growth: Is the Current Trend on the Track to Poverty Reduction?Paper presented at the American Agricultural Economics Association annual meetings, Providence, Rhode Island, July 24-27.

Voortman, R. L. (1985). Guideline on land evaluation for rainfall agricultural in Mozambique.

Warr, P. (2003). Poverty and economic growth in India. In: *Economic Reform and the Liberalization of the Indian Economy,* Eds: K. Kalirajan and U. Shankar. Edward Elgar, Cheltenham, UK and Northampton, MA, USA.

World Bank (1993a). *Technical Paper Number 203 Africa Technical Department Series*.

World Bank (1999). *World development indicators 1999*. Washington, D.C.

World Bank (2008).World development report: Agriculture for Development Policy Washington, D. C.

Zhang, W. B. (2008). International Trade Theory: Capital, Knowledge, Economic Structure, Money, and Prices over Time. Springer-Verlag Berlin Heidelberg.

# **APPENDICES**

APPENDIX : Questionnaire for the Farm Level Survey

**INTRODUCTION**

My name is Kavenuke, Benitho Severine, a Master student from Open University of Tanzania pursuing a research for the fulfillment of the requirement for degree of Masters of Science in Economics. I am now conducting a research report that aims atanalysis of the determinant factors of farmers’ income, the case of Babati District Council, Manyara region, Tanzania. Please fill the questionnaire, the inputs and feedback for this questionnaire are greatly considered, appreciated, and will remain strictly confidential.

**A: DEMOGRAPHIC DATA**

Please respond by filling in the gaps or circle against the correct option as applicable

1. Name of respondent (optional) ……..……..Name of the Ward……..…
2. Name of the Village ……………………. Date …………………………….
3. Gender 1 = Male 0 = Female ( )
4. Age of respondent (yrs) ………………………………
5. Number of years of schooling (Please code education level) ……………….
6. None, 1. Primary 2. Secondary O-level, 3. Secondary A-level 4. Tertiary, 5. University ( )
7. Relation to the household head

1 = Head 2 = Wife 3 = Son/Daughter4 = Other, Specify…… ( )

1. What is your household’s size?
2. Below 15 yrs…………2. Above 15 yrs…………. Above 60 Yrs………

**B: First Objective (to Examine the Participation Rate of Rural Households in Different Income Sources)**

1. What is your current employment? (Please indicate your occupation)

1 = Self employed 2 = Non self employed ( )

1. If self employed, indicate the major type of employment

1 = Agriculture – crops 2 = Agriculture – Livestock

3 = Agricultural wage employment 4 = Non – Farm wage employment

5 = Remittances 6 = Other, Specify ( )

1. If you are dealing with crop production, mention the major three crop that serves you in most of the time as the major income source in your household 1………………………… 2. …………………….. 3 …………………….
2. Participation rate in maize productivity for income generation

1 = Most often 2 = Often 3 = Rarely ( )

**C: Second Objective (to analyze critical determinant factors affecting farmers’ income)**

1. Do you receive any kind of Agricultural extension service?

1 = Yes 2 = No ( )

1. If yes where do you get extension services? 1. Village extension officer, 2. NGOs 3. Research 4. Others (specify)………………… ( )
2. What kind of services/technologies do you get? ............................................
3. Do you have any knowledge about agricultural financial support for the maize production? 1 = Yes 2 = No ( )
4. If yes, had you requested for financial support for maize production

1 = Yes 2 = No ( )

1. If yes in q16 above, did you get it? 1 = Yes 2 = No ( )
2. How long have you engaged in maize production (yrs)? ……………….
3. What is the annual average yield of maize per acre (bags)? ............................
4. What amount of the maize produce is served as a household income (bags)?
5. Which capital do you use most during maize production 1. Financial 2. Physical 3. Both physical and financial capital ( )
6. If physical capital is used, what type? 1. Oxen 2. Tractor ( )
7. What is your farm (Land) size used for crop production (acres)? ...................
8. What is your farm (Land) size used for maize production (acres)? ..................
9. Availability of extension services affect farmers’ income 1 = weakly agreed 2 = Agreed3 = strongly agreed 4 = Disagreed ( )

**D: Third objective (To examine varied factors that determine income differentiation among rural maize farmers)**

1. What amount of money is required to serve as capital for maize production (production cost) per acre? (TShs) …………………………
2. How far is from home to market (km)? ………………………..
3. Do you use agricultural inputs like fertilizers, improved seeds and insecticides in practicing maize production? 1 = Yes, 2 = No ( )
4. Which kind of agricultural inputs usually used? ……………………………
5. What is the average price of maize per bag do you usually sell? (TShs) ……
6. Marketing cost affect/ influence farmers’ income

1= weakly agreed 2 = Agreed 3 = strongly agreed 4 = Disagreed ( )

1. What is your recommendation for improving agriculture crops production and marketing in Babati District Council? ………………………

THANK YOU FOR YOUR CO OPERATION

**APPENDIX 2: Various Tables**

**Farmers social economic characteristics**

|  |  |
| --- | --- |
| Variable | Mean value |
| Farmers age | 41.45 Year (Min 21, Max 83) |
| Farmer household size | Av 6.8 (Min 1, Max 17) |
| Maize farm size | Av 2.3 (Min 0.25, Max 10) |
| Total farm size | Av 3.0 (Min 0.25, Ma 15) |
| Maize yield/acre | Av 12.8 (Min 3, Max 40) |

Average yield of maize per acre

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Descriptive Statistics** | | | | |
|  | N | Minimum | Maximum | Mean |
| Average yield of maize per acre (bags) | 160 | 3 | 40 | 12.82 |
| Valid N (listwise) | 160 |  |  |  |

Family member

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Descriptive Statistics** | | | | |
|  | N | Minimum | Maximum | Mean |
| Total number of family member | 160 | 1.00 | 17.00 | 6.81 |
| Total | 160 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total farm size Descriptive Statistics | | | | |
|  | N | Minimum | Maximum | Mean |
| Total land size used in crop production | 160 | .3 | 15.0 | 3.081 |
| Valid N (listwise) | 160 |  |  |  |

Maize farm size Descriptive Statistics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N | Minimum | Maximum | Mean |
| land size used in maize production | 160 | .3 | 10.0 | 2.344 |
| Valid N (listwise) | 160 |  |  |  |

Gender of Respondent (n=160)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Specification | Village of respondent | | | | | | | | Total |
| Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng'war | Long | Walahu |
|  | Count | 4 | 6 | 3 | 5 | 5 | 0 | 6 | 4 | 33 |
| Female | % within Gender of respondent | 12.1% | 18.2% | 9.1% | 15.2% | 15.2% | 0.0% | 18.2% | 12.1% | 100% |
|  | % within Village of respondent | 20.0% | 30.0% | 15.0% | 25.0% | 25.0% | 0.0% | 30.0% | 20.0% | 20.6% |
|  | Count | 16 | 14 | 17 | 15 | 15 | 20 | 14 | 16 | 127 |
| Male | % within Gender of respondent | 12.6% | 11.0% | 13.4% | 11.8% | 11.8% | 15.7% | 11.0% | 12.6% | 100% |
|  | % within Village of respondent | 80.0% | 70.0% | 85.0% | 75.0% | 75.0% | 100.0% | 70.0% | 80.0% | 79.4% |
|  | Count | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 160 |
| Total | % within Gender of respondent | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 100% |
|  | % within Village of respondent | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Education of Respondent

| **Village** | **Education of respondent** | | | | **Total** |
| --- | --- | --- | --- | --- | --- |
| None | Primary | Secondary-O level | Secondary A-level |
| ARRI | 0 | 20 | 0 | 0 | 20 |
| TSAAYO | 0 | 17 | 3 | 0 | 20 |
| DUDIYE | 1 | 19 | 0 | 0 | 20 |
| Utwari | 2 | 18 | 0 | 0 | 20 |
| Madunga | 3 | 14 | 1 | 2 | 20 |
| Gidng'war | 0 | 20 | 0 | 0 | 20 |
| Long | 0 | 16 | 4 | 0 | 20 |
| Walahu | 0 | 20 | 0 | 0 | 20 |
| Total | 6 | 144 | 8 | 2 | 160 |

Major types of employment

| **Variable** | **Specification** | **Village of respondent** | | | | | | | | **Total** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng 'war | Long | Walahu |
| Agriculture- Crop | Count | 17 | 16 | 16 | 15 | 16 | 14 | 15 | 13 | 122 |
| % within Major1 types of employment | 13.9% | 13.1% | 13.1% | 12.3% | 13.1% | 11.5% | 12.3% | 10.7% | 100.0% |
| % within Village of respondent | 85.0% | 80.0% | 80.0% | 75.0% | 80.0% | 70.0% | 75.0% | 65.0% | 76.2% |
| Agriculture- Livestock | Count | 3 | 4 | 4 | 5 | 4 | 6 | 5 | 7 | 38 |
| % within Major1 types of employment | 7.9% | 10.5% | 10.5% | 13.2% | 10.5% | 15.8% | 13.2% | 18.4% | 100.0% |
| % within Village of respondent | 15.0% | 20.0% | 20.0% | 25.0% | 20.0% | 30.0% | 25.0% | 35.0% | 23.8% |
| Total | Count | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 160 |
| % within Major1 types of employment | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 100.0% |
| % within Village of respondent | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Crop grown as sources of income

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Village respondents | | | | | | | | Total |
| Crop type | Source of income | Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng'war | Long | Walahu |
| Maize | Count | 20 | 20 | 19 | 21 | 20 | 20 | 19 | 20 | 159 |
| % within $INCOMECROP | 12.6% | 12.6% | 11.9% | 13.2% | 12.6% | 12.6% | 11.9% | 12.6% |  |
| % within village | 37.7% | 39.2% | 38.0% | 35.6% | 33.3% | 36.4% | 34.5% | 41.7% |  |
| % of Total | 4.6% | 4.6% | 4.4% | 4.9% | 4.6% | 4.6% | 4.4% | 4.6% | 36.9% |
|  |  | Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng'war | Long | Walahu | Total |
|  | Count | 20 | 20 | 15 | 15 | 4 | 10 | 12 | 20 | 116 |
|  | % within $INCOMECROP | 17.2% | 17.2% | 12.9% | 12.9% | 3.4% | 8.6% | 10.3% | 17.2% |  |
| Beans | % within village | 37.7% | 39.2% | 30.0% | 25.4% | 6.7% | 18.2% | 21.8% | 41.7% |  |
| % of Total | 4.6% | 4.6% | 3.5% | 3.5% | 0.9% | 2.3% | 2.8% | 4.6% | 26.9% |
|  | Count | 13 | 11 | 16 | 0 | 0 | 0 | 0 | 2 | 42 |
| Pegion peas | % within $INCOMECROP | 31.0% | 26.2% | 38.1% | 0.0% | 0.0% | 0.0% | 0.0% | 4.8% |  |
| % within village | 24.5% | 21.6% | 32.0% | 0.0% | 0.0% | 0.0% | 0.0% | 4.2% |  |
| % of Total | 3.0% | 2.6% | 3.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% | 9.7% |
| Count | 0 | 0 | 0 | 4 | 11 | 6 | 13 | 2 | 36 |
|  | % within $INCOMECROP | 0.0% | 0.0% | 0.0% | 11.1% | 30.6% | 16.7% | 36.1% | 5.6% |  |
| Irish potatoes | % within village | 0.0% | 0.0% | 0.0% | 6.8% | 18.3% | 10.9% | 23.6% | 4.2% |  |
|  | % of Total | 0.0% | 0.0% | 0.0% | 0.9% | 2.6% | 1.4% | 3.0% | 0.5% | 8.4% |
|  | Count | 0 | 0 | 0 | 2 | 4 | 1 | 7 | 4 | 18 |
|  | % within $INCOMECROP | 0.0% | 0.0% | 0.0% | 11.1% | 22.2% | 5.6% | 38.9% | 22.2% |  |
| Sweet potatoes | % within village | 0.0% | 0.0% | 0.0% | 3.4% | 6.7% | 1.8% | 12.7% | 8.3% |  |
|  | % of Total | 0.0% | 0.0% | 0.0% | 0.5% | 0.9% | 0.2% | 1.6% | 0.9% | 4.2% |
|  | Count | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 6 |
|  | % within $INCOMECROP | 0.0% | 0.0% | 0.0% | 0.0% | 33.3% | 0.0% | 66.7% | 0.0% |  |
| Green | % within village | 0.0% | 0.0% | 0.0% | 0.0% | 3.3% | 0.0% | 7.3% | 0.0% |  |
| Gram | % of Total | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% | 0.0% | 0.9% | 0.0% | 1.4% |
| Count | 0 | 0 | 0 | 17 | 19 | 18 | 0 | 0 | 54 |
|  | % within $INCOMECROP | 0.0% | 0.0% | 0.0% | 31.5% | 35.2% | 33.3% | 0.0% | 0.0% |  |
| Garlic | % within village | 0.0% | 0.0% | 0.0% | 28.8% | 31.7% | 32.7% | 0.0% | 0.0% |  |
|  | % of Total | 0.0% | 0.0% | 0.0% | 3.9% | 4.4% | 4.2% | 0.0% | 0.0% | 12.5% |
|  | Count | 53 | 51 | 50 | 59 | 60 | 55 | 55 | 48 | 431 |
|  | % of Total | 12.3% | 11.8% | 11.6% | 13.7% | 13.9% | 12.8% | 12.8% | 11.1% | 100.0% |

Participation rate of maize productivity for income generation

| **Variable** | **Specification** | **Village of respondent** | | | | | | | | **Total** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Arri | Tsaayo | Dudiye | Utwari | Madunga | Gidng'war | Long | Walahu |
|  | Count | 13 | 11 | 12 | 15 | 15 | 15 | 16 | 18 | 115 |
| Most often | % within Participation rate in maize productivity for income generation | 11.3% | 9.6% | 10.4% | 13.0% | 13.0% | 13.0% | 13.9% | 15.7% | 100.0% |
|  | % within Village of respondent | 65.0% | 55.0% | 60.0% | 75.0% | 75.0% | 75.0% | 80.0% | 90.0% | 71.9% |
|  | Count | 7 | 5 | 7 | 5 | 4 | 5 | 4 | 0 | 37 |
| Often | % within Participation rate in maize productivity for income generation | 18.9% | 13.5% | 18.9% | 13.5% | 10.8% | 13.5% | 10.8% | 0.0% | 100.0% |
|  | % within Village of respondent | 35.0% | 25.0% | 35.0% | 25.0% | 20.0% | 25.0% | 20.0% | 0.0% | 23.1% |
|  | Count | 0 | 4 | 1 | 0 | 1 | 0 | 0 | 2 | 8 |
| Rarely | % within Participation rate in maize productivity for income generation | 0.0% | 50.0% | 12.5% | 0.0% | 12.5% | 0.0% | 0.0% | 25.0% | 100.0% |
|  | % within Village of respondent | 0.0% | 20.0% | 5.0% | 0.0% | 5.0% | 0.0% | 0.0% | 10.0% | 5.0% |
|  | Count | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 160 |
| Total | % within Participation rate in maize productivity for income generation | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 100.0% |
|  | % within Village of respondent | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

# 

Measure of Model Fit

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | **R** | **R2** | **Adjusted R2** | **Std. Error of the Estimate** | **Change Statistics** | | | | | **Durbin-Watson** |
| R 2 Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .851a | .724 | .709 | 545217.782 | .724 | 49.192 | 8 | 150 | .000 | 1.782 |

| **Variable** | **Unstandardized Coefficients** | | **Standardized Coefficients** | **T** | **Sig.** |
| --- | --- | --- | --- | --- | --- |
|  | B | Std. Error | Beta |
| (Constant) | 235061.309 | 516203.851 |  | .455 | .650 |
| Age | -13113.514 | 7339.201 | -.146 | -1.787 | .076 |
| Education | 23288.134 | 128616.613 | .009 | .181 | .857 |
| Capital | .904 | .559 | .073 | 1.618 | .108 |
| Farm size | 548617.550 | 28932.342 | .835 | 18.962 | .000 |
| Receive extension services | -116779.561 | 94736.258 | -.056 | -1.233 | .220 |
| Inputs | -363816.894 | 162239.657 | -.105 | -2.242 | .026 |
| Experience | 13925.619 | 6602.790 | .177 | 2.109 | .037 |
| Price | 7.998 | 10.810 | .032 | .740 | .461 |
| Yield | 87490.213 | 4243.439 | .497 | 20.618 | .000 |
| Marketing cost | -34350.639 | 19318.366 | -.042 | -1.778 | .077 |

Average Farmers’ Income Per Annum

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | N | Minimum | Maximum | Mean | Std. Deviation |
| Farmers income | 160 | 34200 | 6912000 | 1159913.12 | 1010831.139 |

APPENDIX : Pictures

Maize Warehouse and Pigeon Peas Field



**Gallapo AMCOS Maize Warehouse (1) Pigeon Peas Field (2)**

Photo 2 &3: Garlic Production in Gidng’war



Photo 3 photo 4

**Garlic farm field at Gidng’war Village**