

**DETERMINANTS OF RURAL POVERTY IN KENYA: THE CASE OF CASH CROP
GROWING**

BY:

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DECLARATION

I hereby declare that this research paper is my original work, which has not been undertaken anywhere else in any university for the award of a degree.

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APPROVAL

This paper has been submitted for examination with my approval as the university supervisor

Supervisor	Sign	Date
Prof. Tabitha Kiriti Ng'ang'a

DEDICATION

This work is dedicated to my late dad Samson Joe Machio, my loving mum Gladys Nakhumicha Machio and my siblings: Phyllis (Caro), Christine, William and Joseph for their support, love and care. I am so thankful.

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ABBREVIATIONS AND ACRONYMS

FGT	Foster, Greer and Thorbecke
KNBS	Kenya National Bureau of Statistics
KIHBS	Kenya Integrated Household Budget Survey
KIPPRA	Kenya Institute for Public Policy Research and Analysis
ROK	Republic of Kenya
UN	United Nations
WB	World Bank

ABSTRACT

Poverty in Kenya remains to be an issue of concern despite several measures the government has taken in alleviating it. Rural poverty rates are higher compared to urban poverty levels. Designing appropriate policies requires understanding the determinants of poverty. This paper presents an analysis of factors affecting rural poverty in Kenya with a major focus on cash crop farming with an aim of contributing to efforts towards poverty alleviation. This study uses a logistic model to analyze the determinants of poverty using KIHBS 2005/6 data. The study found that engagement in cash crop farming increases probability of a household being poor. Other factors that significantly affect poverty include: level of household income, level of education of household head, ownership of livestock and the household size. This study recommends that the government should aid the farmers who engage in cash crop farming through the stabilization of fluctuating prices, providing extensive research regarding the types of diseases affecting the crops grown as well as reduced costs of farm inputs and improved accessibility to credit at low interest rates.

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CHAPTER ONE: INTRODUCTION

1.0 Background

Poverty is a multidimensional phenomenon. There are a wide variety of approaches to its definition and measurement. According to World Bank (2000), poverty refers to lack of a good standard of living which can be measured by an individual's possession of basic necessities which includes; education, nutrition, income, health, assets, housing. Poverty can also be defined as lack essential factors of production which are classified into three categories; capital, human and natural resources and adequate income to ensure sustainable livelihoods; poor health; increased death rates; lack of food; destitution and inadequate housing; limited or lack of access to formal education and other basic services, insecure environments and social discrimination and exclusion as per (United Nations, 1995).

It can also be defined in relative and absolute terms according to the republic of Kenya (RoK 1998). Absolute poverty refers to having less than an objectively determined minimum. It is a state where one has difficulties in raising the income that is required to meet the cost of basic needs. Relative poverty refers to having significantly less income than others around. It is when one cannot sustain a standard of living that is enjoyed by a particular social group such as middle income.

Poverty measure is an index that shows a society's poverty level. One measure of poverty that has been found manageable in presenting information on the poor is Foster, Greer and Thorbecke (FGT). It is used to measure three components of poverty, which are the level (headcount), gravity (depth) and intensity (severity). The poverty headcount indices measures the number of poor individuals against the total population, the poverty gap measures the gravity of poverty, it provides information on the magnitude of poverty among the poor people in relation to the poverty line while poverty severity index measures how poor the poor are (Foster et al. 1984).

Poverty in Kenya still remains a huge challenge. The general, poverty levels rose from 40 per cent in 1994 to 52.3 per cent in 1997 before reducing marginally to 45.9 per cent in 2007 (Kenya National Bureau of Statistics (KNBS, 2007). Thereafter, poverty is estimated to have increased to 50.8 per cent in 2008 before declining marginally to 49.8 per cent in 2012 (Kenya Institute of Public Policy Research and Analysis (KIPPRA, 2013). Rural poverty has always been higher than urban poverty. While rural poverty was 46 per cent in 1992, urban poverty was 29.3 per

cent in the same year. By 1997 the gap narrowed with rural poverty increasing to 52.9 per cent while urban poverty increasing to 49.2 per cent. In 2007 the gap had widened again with rural poverty at 49.1 and urban poverty at 33.7 per cent (Kenya National Bureau of Statistics (KNBS). It is estimated that in 2012 rural poverty was at 55% while urban poverty was at 35.5 per cent (Kenya Institute of Public Policy Research and Analysis (KIPPRA, 2013).

Region wise poverty levels were estimated to be highest in north eastern with adult equivalent being estimated¹ at 73.9 percent followed by coast province whose estimates stands at 69.7 percent, Eastern , Nyanza, Rift Valley and Western had the following estimates 50.9 percent, 47.6 percent,49.0 percent and 52.2 percent respectively in 2007 (Kenya National Bureau of Statistics (KNBS, 2007). Table 2 shows the absolute poverty levels of various regions in Kenya.

Table 1: Absolute poverty rates 2005/6

Region	Adult equivalent	Household	Individuals
Central	30.4	24.3	30.7
Coast	69.7	59.5	70.1
Eastern	50.9	45.1	51.5
North .Eastern	73.9	66.1	73.5
Nyanza	47.6	42.2	47.5
Rift Valley	49.0	41.5	49.3
Western	52.2	47.0	53.1

Source: Kenya National Bureau of Statistics (2007).

Rural households are characterized by low productivity, poor nutrition and low health standards (Ogato et al., 2009). Their incomes are also characterized by seasonal fluctuations as well as inaccessibility to markets and institutions that offer financial services. In Kenya, agriculture is the source of livelihood to 70 percent of the population living in the rural areas. However, agricultural productivity has remained low. It recorded a growth of 3.5 per cent in 2014 as a result of a decline in some of the key crops production such as maize production which decreased from 40.7 million bags in to 39.0 million bags in 2013(Kenya National Bureau of Statistics (KNBS, 2013).

¹Adult equivalence scale refers income per adult increasing proportionately in order to maintain a specific level of the living standard of households factoring demographic changes (Lewbel, A and Pendakur, K 2006).

In rural Kenya, the economy of agriculture has majored in subsistence farming and a well-developed commercial sector. In areas that record heavy rainfall agricultural activities practiced are concentrated on crop production and mixed farming while those areas that receive relatively little amount of rainfall engage mostly in cattle ranching. Mainly grown crops include tea, coffee, maize (grown specifically for commercial purposes) and sugarcane which are mostly grown in the central, Eastern, Western and Nyanza except for the maize which is predominantly grown in south eastern, rift valley and western regions.

1.1 Problem statement

In Kenya, poverty is an issue of concern since data shows that almost half of Kenyans are stuck in poverty. Rural poverty rates are even more worrying since they always lie above urban poverty rates as shown in the data, yet majority of Kenyans live in rural areas. Factors that affect rural poverty are more likely to be associated with agriculture since most rural residents engage in agricultural activities. To what extent does farming help improve income levels of the rural population? Main cash crops in Kenya include: maize, coffee, tea and sugarcane. The government has in the past tried to subsidize and promote production of these crops. But do households that engage in these crops less likely to be poor? This is the question that this study attempts to answer.

1.2 Objectives of the study

The main objective of this study is to establish the determinants of rural poverty in Kenya with specific objectives being:

- To determine the effect of cash crop production on rural poverty in Kenya;
- To make policy recommendations in an attempt to curb rural poverty in Kenya.

1.3 Justification of the study

Despite the government's various intervention aimed at combating poverty through national development programmes, substantial reductions in poverty have not been achieved. Designing appropriate policies requires understanding the determinants of poverty. Results from this study will therefore aid the government in designing targeted policies to deal with rural poverty. While studies such as Geda, et al. (2005), Onyeiwu, et al. (2013) and Elhadi, et.al. (2012) have studied rural poverty; such studies do not consider specifically how cash crop farming affects rural

poverty. Therefore this study will also add to other studies analyzing rural poverty forming references for future research.

1.4 Organization of the study

The rest of the paper is organized as follows: chapter 2 reviews the theoretical and empirical literature on determinants of poverty as well as rural poverty. The methodology used to analyze data is presented in chapter 3.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of both theoretical and empirical literature that focuses on determinants of poverty especially those that focus on rural poverty. Sections 2.2 and 2.3 review theoretical and empirical literature respectively, while section 2.4 provides an overview of the literature.

2.2 Theoretical literature

There are various theories of poverty. One such theory is the individualistic theory of poverty which claims that poverty is self-imposed and it can be avoided if the individuals put more effort in their work and make better life choices. (Asen, 2002). It also explains poverty to be as a result of traits that are built-in the individual such as lack of inherited qualities for example intelligence that can prove difficult to be reversed. This theory states that the poor people become poor due to their lack of ability to compete with others for resources. This theory perceives poverty as a spiritual guideline that equates prosperity with the kindness of God and believed that peoples' sins or their parent's sins leads to them being punished by God.

In favor of the individualistic theory, neo classical economists advocate that the choices that are made by the poor make them poor. They claim that poverty is caused by individuals' choices and investments that are meant to greatly improve their welfare. Economic theory explains that an individual's choice of earning low income makes them answerable for making choices that lead them to poverty.

The theory of neoclassical puts emphasis on the role of the uneven initial endowments of capital, skills and talents which determines the output of an individual in generating poverty, within an economic system that has market-based competition. The theory also views that poverty can be made worse by the presence of market failure in terms of adverse selection, moral hazard and externalities, as well as incomplete information. According to the theory, the role played by uncertainty in causing poverty is major because those who are poor are more susceptible to shocks to their well-being.

Structural theory of poverty does not blame an individual as responsible for being poor but rather blames the political, economic and social systems which limit people's opportunities and ability to better their welfare. This theory perceives that people are poor due to wage problems related to barriers that happen to be structural that prevent the poor people from getting good paying jobs, limited number of jobs available to the workers and very slow growth in sectors supporting workers that have low skills (Tobin, 1994). The theory advocates for the elimination of structural barriers and implementing a wide range of socioeconomic policies to aid in reducing poverty. The social economic policies include: employment creation, paying good wages, making medical care accessible, and overseeing the effective implementation of insurance programs, in order to change the system it will involve forming better institutions that easily accessible, transparent, innovative, secure and focus on improving the welfare of the poor. (Bradshaw, 2007)

Sen (1982) discusses the various approaches used to identify and aggregate the poor. The first one is the biological approach. This approach has to do with whether individuals' income is adequate to obtain the basic requirements for maintenance of physical productivity. This approach is associated with difficulty in defining nutritional requirements accurately. The other approach is the inequality approach where poverty and inequality are seen as same concepts. Poverty is seen as a concept of poverty. He argues that while different distributions of poverty may reduce poverty; poverty and inequality are not equivalent. Relative deprivation approach defines the poor as those who have been deprived. Individuals are considered poor if they possess less of some desired attribute whether its income, employment opportunities or power than do others. One problem with this approach has to do with subjectivity of choice of condition of deprivation and choice of reference group. Then there is the value judgment approach where poverty is viewed like beauty. He argues against this that contemporary standards of the society must be taken into account. Finally is policy definition which defines poverty based on some standards of public policy. For example if society believes that people should not die of starvation, then poverty can be defined as lack of minimum food and shelter to maintain life. The problem with this is that policy is a function of political organization that depends on many factors.

2.3 Empirical literature

The theoretical literature reviewed above indicates that poverty is as a result of individuals' characteristics as well as structural barriers. This section reviews the empirical studies.

Bogale, et al. (2005), studied the determinants of rural poverty in Ethiopia using data from a survey that was carried out in the rural areas in three districts. Foster, Greer and Thorbecke (FGT) poverty index was used to study the magnitude and intensity of poverty in rural Ethiopia. A logit model was used in the study to estimate the data with explanatory variables used being: land holding, number of oxen, size of the household, education of the head of the household, dependency ratio as well as age of the head of the household. The author found that lack of key assets such as human capital; oxen and land were reasons behind the persistence of poverty in rural Ethiopia.

A study by Masanjala (2005), on liberalization of cash crop and alleviation of poverty in Malawi used three round household survey data to analyze. Data analysis for this study was done using a model called latent welfare. The study found that households that chose to grow cash crops received incomes that were higher as compared to those chose not grow cash crops, but as much as these households had increasing incomes, may not be enough to get the poor out of poverty.

Ennin, et al. (2010), uses a logit approach to analysis determinants of poverty in Ghana. In order to determine the factors that affect the poverty status of households, the study used a binary logit model. The data used was obtained the Ghana Living Standards Survey. The findings from the analysis indicate that households that are larger, household heads with no formal education, and households with agriculture as their main occupation are more likely to be poor.

A study by Twerefou, et al. (2014), examines the factors that determine the level of poverty among households that are headed female and those households that are headed by male in Ghana. The study uses logistic regression model and a two-fold Blinder-Oaxaca decomposition. Household characteristics identified as explanatory variables that the study used were; the size of the household, age of the head of the household, household employment income and remittances, number of dependents within the household, work experience of the head of the household head and members, education level of the head of the household, marital status of the head, location and ecological zone of the household, migration status of the household head,

education level of the head of the household and employment status of the household head. The study finds that households that are headed by male are poorer relative to households that are female headed because on the average, they have larger household size, constitute a higher percentage in rural areas and savannah zones.

Elhadi, et al. (2012) study used Baringo district to be a representative area of study in investigating factors that influence level of poverty among farmers who keep livestock and grow crops in Kenyan semi-arid areas. The study used a logit model to study the relationship between the level of poverty and the explanatory variables. The results were that ownership of enclosures, head of the household, access to other sources of livelihood, distance to the nearest market, household size, were the major factors that determined poverty levels.

A study by Oyugi, et al. (2000) used data from the 1994 Welfare Monitoring Survey in Kenya. Household characteristics identified as explanatory variables that were used in the study were household size, off-farm employment, livestock unit, and sector of economic activity, the number of literate members in the household and source of water for household use. Their analysis was done using a probit model and they found out that variables used were important factors influencing poverty.

Onyeiwu, et al. (2013)) studied factors that determine income and levels of poverty in rural Kenya using data from the socio economic survey and did the analysis using the panel regressions. The study established the level education to be an important factor of income. The study further found that household size, average age of adult in the household, proportion of female members in a household, per capita land holding and value of assets possessed by the household were significant determinants of income. The results also suggests that engagement in farming does not affect a household level of income and that nonagricultural sources of income offer better opportunities for curbing poverty.

A study by Geda, et al. (2005) carried out to examine determinants of poverty status in Kenya. The study used household level data from the Welfare Monitoring Survey collected in 1994. The study used binomial and polychotonous logit models in the estimation. The results from the study found that household size, the level of education, and engagement in agriculture were strongly linked to poverty in both rural and urban regions. The factors that were found to be

important determinants of general levels of poverty in the binary logit model were also found to be determinants in the ordered-logit model.

A study by Mariara – Kabubo (2002) explored the impacts of property rights and assets on household poverty, among herders in Kajiado district of Kenya. The study collected primary data and it also used data from secondary sources. A probit model and OLS method was used in the study to determine the factors influencing poverty levels among herders and to also explain the dependent variable. The results from the study indicate that possession of wealth, attainment of education and well defined property rights, are important determinants of poverty.

Githinji (2011) studied the determinants of the level of poverty of rural Kenya. The study found that not only does education reduce the likelihood of a household being poor but also increase in women education reduces the size of the household and the ratio of the children to adult. According to the study, access to markets, reduces the chances of a household being poor. Earnings from other sources of income tend to increase the earnings of households that engages in agriculture.

Okwi, et al. (2007) investigated the effects of geographical factors on the level of poverty in rural Kenya. The technique used to find out if the geographical factors had an effect on poverty incidence was called spatial regression technique. Demographic variables and the geographical factors including soil type, slope, type of land use and elevation, were the major factors to be considered in explaining the effect on poverty. The study found poverty to be lower in locations with good soils due to high agricultural potential attributed to good soil. The results also showed that locations that experience longer rain periods had lower poverty rates relative to areas with shorter rain periods.

2.4 Overview of literature

Based on the above discussion of both the theoretical and empirical literature, it is possible to identify various factors that affect the likelihood of an individual or household experiencing poverty. As pointed out in the theoretical literature, poverty can result from either individual/household; that is, households characteristics or due to structural barriers that are out of an individual's or households' control. These characteristics can be divided into two broad categories socio economic and demographic characteristics. From the literature the most

common demographic characteristics that are linked with poverty include household size and structure, dependency ratio, the age of the head of the household and the gender of the head of household. Socioeconomic characteristics that explain poverty do include household assets, level of education, means of livelihood, access to credit and markets and household employment. In rural areas, the cropping system of the household can affect the income obtained from farming activities.

Previous studies report mixed findings on the effect of farming on poverty. While some studies finds that engagement in agriculture as strongly related to poverty reduction, others find that farming does not influence income and hence poverty. Further studies on this area may be value adding especially with a focus on cash crop farming. Cash crop farmers may generate higher income and, therefore, be less poor than food crop farmers irrespective of the amount of inputs and the size of the cultivated land.

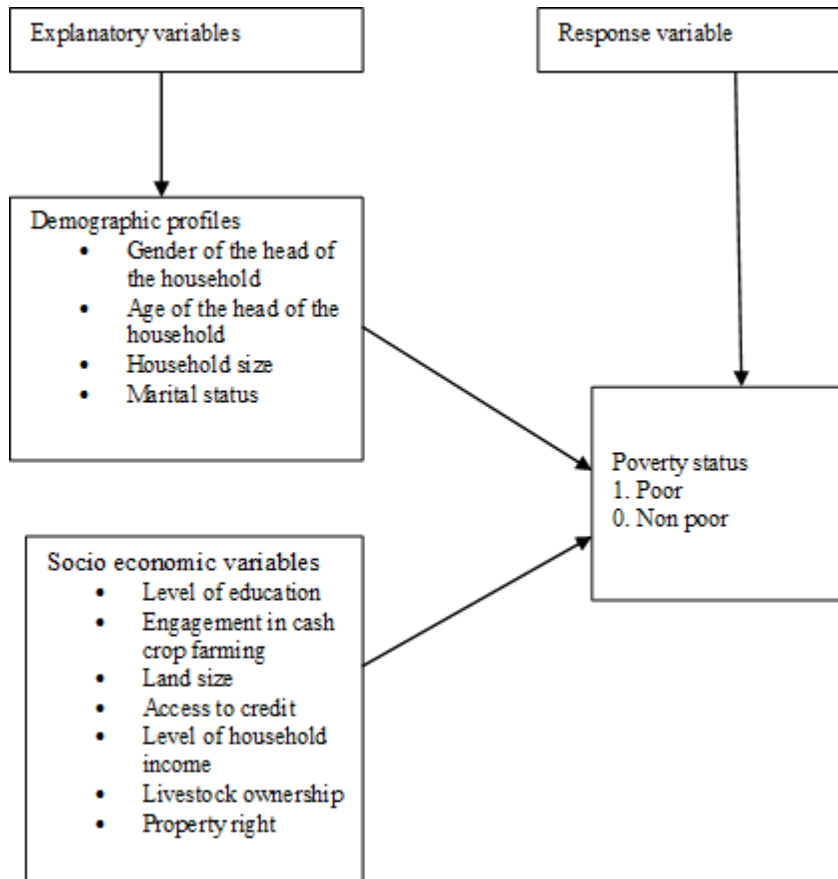
CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter presents methods and procedures used in analyzing the determinants of rural poverty in Kenya. Sections 3.1 and 3.2 present the conceptual framework and model specification respectively, while section 3.3 presents the definition of variables and section 3.4 gives the data source.

3.1 Conceptual framework

The conceptual framework of the study is presented in figure 1.



Source: Adopted from Bogale, et al (2005)

3.2 Model specification

It is assumed that there is a latent variable that generates a binary outcome which is whether a household is poor or if they are non-poor. Let this latent variable that is unobserved be P^* . Households with high P^* will be observed as poor while those with low P^* will be observed as non-poor. (Wooldridge 2002)

The latent variable is assumed to be linearly related to the independent variables as follows

$$P_i^* = X_i\beta + \varepsilon_i \dots \dots \dots \text{Equation 1}$$

The latent variable P^* is linked to binary variable as

$$P_i = \begin{cases} 1 & \text{if } P_i^* > 0 \\ 0 & \text{if } P_i^* \leq 0 \end{cases}$$

Where 0 is the cutoff point. The binary model is written as

$$\Pr(P = 1 | X) = \Pr(P^* > 0 | X) \dots \dots \dots \text{Equation 2}$$

Replacing the latent variable in equation 1 we have

$$\Pr(P = 1 | X) = \Pr(X_i\beta + \varepsilon > 0 | X)$$

Subtracting both sides of the inequality by $X_i\beta$

$$\Pr(P = 1 | X) = \Pr(\varepsilon > -X\beta | X)$$

But since cumulative distribution function (CDF) expresses the probability of a variable being less than some value, the sign of inequality must be changed. The model will be written as

$$\Pr(P = 1 | X) = \Pr(\varepsilon \leq X\beta | X) \dots \dots \dots \text{Equation 3}$$

Equation 3 is simply the cumulative density function or the error distribution evaluated at $X\beta$.

The logit model will therefore be written as

$$\Pr(P = 1 | X) = \Lambda(X\beta)$$

In the estimation of logit models, maximum likelihood estimation is used. The likelihood function is defined as follows:

$$P_i = \begin{cases} \Pr(P_i | X_i) & \text{if } P_i = 1 \text{ is observed} \\ 1 - \Pr(P_i | X_i) & \text{if } P_i = 0 \text{ is observed} \end{cases}$$

The likelihood function used in the estimation is given by

$$L(\beta | P, X) = \prod_{i=1}^N P_i \dots \dots \dots \text{Equation 4}$$

Using equation 2 we can write we can write the likelihood as

$$L(\beta | P, X) = \prod_{P=1} \Pr(P_i | X_i) \prod_{P=0} [1 - \Pr(P_i | X_i)]$$

Using equation 3 this becomes

$$L(\beta | P, X) = \prod_{P=1} \Lambda(X_i, \beta) \prod_{P=0} [1 - \Lambda(X_i | \beta)]$$

Since we maximize the log likelihood function we obtain this by taking logs to get

$$\ln L(\beta | P, X) = \sum_{P=1} \ln \Lambda(X_i, \beta) + \sum_{P=0} \ln [1 - \Lambda(X_i, \beta)] \dots \dots \dots \text{Equation 5}$$

We then look for $\hat{\beta}$ that maximizes the above log likelihood function. The $\hat{\beta}$ will be interpreted using the marginal effects.

The poverty equation to be estimated can be written as

$$P = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \varepsilon$$

Where

P = Poverty

X1= Education of household head

X2= Engagement in cash crop farming

X3=Household size

X4=Size of Land

X5=Sex of head of household

X6= Age of head of household

X7= Access to credit

X8= Property rights

X9= level of household income

X10= Livestock ownership

X11= Marital status

E= Error term

This model can also be written as;

$$P = \beta' X_i + \varepsilon$$

Where X is a set of independent variables, β 's are parameters to be estimated and ε is the error term.

3.3 Definition of variables

In the logistic regression in this study, the dependent variable is a binary variable. It takes value 1 if a household is poor and a value zero if a household is non poor. The predictor variables include: education of household, engagement in cash crop farming, household size, remittances, gender of household head, head of the household's age, access to credit and number of livestock owned. The study analyzes how the variables affect poverty status of a household.

Education of household head

Increase in the education of a household head is expected to reduce the poverty level of a household. This is because education that a household has attained will help influence him/her in terms of access to opportunities and information thus affecting poverty levels. Elhadi, et al. (2012) and Geda et al. (2005) found that household heads with formal education (in particular high school and university education) is an important factor that is associated with poverty and that lack of any formal education leads to a higher probability of being poor. Onyiewu, et al. (2013) findings corroborates with the above findings, according to this study having attained education increases the household earnings in that the higher the level of education the higher the income earned.

Engagement in cash crop farming

Households engaging in cash crop farming are expected to experience either low or high poverty levels. This is due to the fluctuating prices of the cash crops. According to Geda, et al. (2005), engaging in agriculture as main occupation in rural areas is more closely associated with poverty than in urban areas. The study found that engagement in agriculture makes a household more poor. This finding differs from Masanjala (2005) who found that engagement in cash crop will increase income of a household, which may not be enough to bring the poor out of poverty if they look at the farm household as a consumer. Findings reveal that growing cash crops helps the rural household to increase their yields and consequently, their overall income.

Household size

Poverty levels are expected to be high in a larger household. This is associated with a higher dependency ratio due to a larger number of children. This is also because of size of a family being assumed to having consumption rate that is relatively higher leading to a high demand for income to acquire basic requirements (Elhadi, et al., 2012). According to Onyeiwu, et al. (2013), a larger household size has a reducing effect on the income level of a household.

Sex of household head

Poverty levels are expected to be high in households that are headed by female as compared to households that are headed by male. These may be due to factors such as lack of access to credit and other financial services, laws governing property and equal opportunities to securing a job Githinji (2011); Geda, et al., (2005) and Oyugi, et al. (2000).

Size of land

Poverty levels are expected to be high in individuals with small size of land since land is an important factor of production which is essential in production and income generation. Studies such as Geda, et al., (2005) found the size of land to be among the determinants poverty.

Access to credit

Access to credit is expected to reduce the level of poverty experienced by households. This is because it provides capital to purchase inputs needed to increase agricultural productivity for example it can help in the purchasing of fertilizer as well as recommended seeds for a certain type of crop. This will help in increasing output thus more saving leading to increased investment that may help in poverty reduction. Availability of microcredit would also enable them to invest in productive assets; pay for their children's education, and in some cases support better nutrition and health (Onyiewu, et al., 2013).

Livestock ownership

Ownership of livestock is expected to reduce the likelihood of an individual being poor. This is because livestock is a major source of income to the rural households in Kenya. Studies such as Bogale, et al. (2005) and Elhadi, et al. (2012) find that ownership of livestock leads to income diversification to be used by a household.

Age of household

Poverty levels of a household are expected to reduce as age of the household head increases. This is because as the age of a person increases they tend to own more asset; and secondly, there can be changes in the structure of the family with time, so as the children start growing up they can either can leave the household or contribute in lab our force to various farm activities. (Bogale, et al., 2005). In Kenya, the average age of a farmer is 60 years, this is one who has experienced all the challenges that comes with farming, and is able to predict weather patterns as well as make informed decisions regarding farming.

Property rights

Poverty levels are expected to be lower in households who have their own parcels of land than those households who own land communally. This is because well-defined property rights spurs productivity and the welfare of the poor. It can lead to improved productivity due to a farmer being at liberty of deciding what to do with the land as well as increase the assets owned by a farmer. (Kabubo – Mariara, 2002).

Non-farm incomes

Poverty levels are expected to be lower in households that access non farms incomes. This helps reduce poverty levels through direct impact of increased consumption and also households will channel their additional incomes into mechanisms that increase output hence higher productivity, which reduce poverty through increased incomes (Kabubo- Mariara, 2002). As presented by per capita daily income, access to other non-farm incomes greatly contributes in determining the poverty level of a household, and therefore, whether a household is poor or not. Therefore, household that has access to alternative sources of livelihood, will have a higher per capita income and therefore experience lower levels of poverty (Elhadi, et al., 2012).

Table 2: variables in the study and expected signs

Variables	Operational measure	Expected sign
Education of household head	1 if no education, 0 otherwise 1 if primary, 0 if otherwise 1 if secondary, 0 if otherwise 1 if tertiary, 0 if otherwise	-
Engagement in cash crop farming	1 if yes and 0 if otherwise	+/-
Household size	Number of household members	+
Size of land	In hectares	-
Sex of household head	1 if male 0 if otherwise	+/-
Age of household age	Age of household in years	+/-
Credit access.	1 if yes 0 if otherwise	-
Property rights	1 if privately owned 0 if otherwise	-
Level of household non-income	Amount of non-farm income	-
Livestock ownership	1 if yes 0 if otherwise	-
Marital status	1 if married 0 if otherwise	+

3.4 Data source

The empirical analysis of this study used the 2005/6 Kenya Integrated Household Budget Survey data. The data was designed to measure poverty levels and the living standards in Kenya. The survey was conducted on 1,343 randomly selected clusters covering all districts in Kenya. The clusters were selected from a pool of 1800 clusters which consisted of 540 and 1260 urban and rural respectively. Each cluster comprised of 10 households resulting to a total sample of 13430 households Kenya National Bureau of Statistics (KNBS, 2007).

CHAPTER 4: DATA ANALYSIS, RESULTS AND DISCUSSION

4.0 INTRODUCTION

This chapter highlights the findings of the study and discussion of the results. Section 4.1 presents the descriptive statistics of the variables used in the analysis. Section 4.2 presents the findings of the logit model of the effect of cash crop farming on rural poverty.

4.1 Descriptive statistics

Table 3 presents the descriptive statistics: the mean and the standard deviation of the variables used in the study of determinants of rural poverty. It is revealed that about half (48 percent) of the households sampled were poor and most of them were male headed households (71 percent). The households head average age was 47 years and most household heads (79 percent) were married. Further, many of the household heads had no formal education (34 percent) and primary education (29 percent) compared to 19 percent who had either secondary education or tertiary education.

The average size of the household was 6 members and although many households in the sample (75 percent) owned land, only about half (45 percent) were engaged in cash crop farming and the same percentage owned livestock. Also majority of the households (90 percent) were not credit constrained and 12 percent had other sources of income other than from cash crop farming.

Table 3 : Descriptive statistics

Variable	Mean	Standard Deviation	Observations
Dependent variable			
Poverty	0.48	0.50	55460
Independent variables			
Sex of household head	0.72	0.45	55282
Marital status of household head	0.79	0.40	55050
Household size	6.38	3.09	55481
Age of household head	46.63	14.80	55282
No education	0.34	0.48	39481
Primary education	0.29	0.45	39710
Secondary education	0.17	0.38	39710
Tertiary education	0.19	0.39	39710
Ownership of land	0.79	0.43	37223
Engagement in cash crop farming	0.45	0.50	52379
Livestock ownership	0.70	0.46	55481
Access to credit	0.10	0.30	41533
Level of household income	475.76	10652.65	49792
Age squared	2393.48	1547.45	55282

Source: Authors computation**4.2: Determinants of rural poverty in Kenya**

The study used the logistic regression to analyze the determinants of rural poverty with the dependent variable being a binary variable of whether or not an individual is poor. The marginal effects are presented in table 4. The coefficients are in the appendix table A1. They indicate the relationship between the explanatory variables; engagement in cash crop farming, gender of the

head of the household, the household head level of education, ownership of the livestock, household size, marital status and the level of household income and the response variable (poverty).

The findings indicate that household that engages in cash crop farming are more likely to be poor. The results show that households who engage in cash crop farming are 8 percent more likely to be poor as compared to those who do not engage in cash crop farming. Geda et al. (2001), study found the same results that engagement in agriculture by a household will increase the likelihood of a household being poor, a study by Masanjala (2005) however, found different results that engagement in cash crop farming will increase the income of a household. The study hypothesized engagement in cash crop farming to either increase or reduce poverty and the results obtained indicate that engagement in cash crop farming increases the chances of a household being poor. This could be because of price fluctuations of cash crops both locally and internationally. Kenyan farmers also face high cost of production such as high prices of fertilizers which may make return for cash crop farming so small or even negative. Farmers who engage in cash crop farming are more likely to also be faced with the challenges of delayed payments, competition from the world market and pests and diseases.

Education reduces the likelihood of being poor. Households heads with tertiary, secondary and primary education had a lower chance of being poor than those household heads with no formal education. The findings indicates that households who have primary education are 56 percent less likely to be poor compared to those who don't have any formal education, they also indicate that households who have attained secondary and tertiary education are 20 percent and 29 percent respectively less likely to be poor compared to households with no formal education. The findings of this study are the same as Elhadi et al. (2012) and Geda et al. (2005) findings that educational attainment of household heads reduces the probability of a household being poor. Onyeiwu et al. (2013) findings also found that education has a positive effect on household earnings. The study had assumed that household heads with educational attainment will reduce the chances of them being poor which was what was obtained in the results. This is because household heads that are educated are likely to be more productive than their uneducated counterparts and hence more likely to be non-poor.

The findings also indicated that a larger household increased the probability of a household being poor. They indicate that a larger household is 5 percent more likely to be poor compared to a smaller household. The findings are in line with the hypothesis made in the study which was that a smaller household size will reduce the chances of a household being poor. This is because larger household may mean increased dependency. This study's findings corroborates with Elhadi et al. (2012) whose findings indicated that a larger family has a high demand for income to secure basic necessities, Onyeiwu et al. (2013) findings which associated larger household size to poverty due to a negative effect on the household income. Larger households tend to be associated with large incomes since the households have a number of people earning a living on average. This may be the case in the urban areas due to the availability of work opportunities compared to majority subsistence farmers living in rural areas where majority with larger families.

The study found that ownership of livestock reduced the likelihood of a household being poor. This was the result that the study expected to get. According to these finding households who own livestock are 7 percent less likely to be poor compared to the households who do not own livestock. Ownership of livestock mean an alternative source of income and hence the negative relationship with poverty. This finding is the same as Elhadi et al. (2012) and Bogale et al. (2005). These studies found that ownership of livestock reduced the likelihood of a household being poor. This is because livestock is a major source of income in rural areas as it leads to income diversification that a household can use to meet their basic requirements. The income diversification is in the sense of income that is generated through sale of livestock products and since there is reduction in consumption expenditure for households instead of purchasing the livestock products households will save more.

Findings from this study also indicate that being married increases the chance of a household being poor. They reveal that individuals who are married are 2 percent more likely to be poor as compared to individuals who are not married. This finding corroborates with Twerefou, et al. (2014) findings that being married increases the probability of being poor. This is due to the increased number of people depending on the household heads. This is because being married

comes with increased size of the household and this result to increased consumption expenditure. The findings also indicate that household's with a high level of other incomes are less likely to be poor. This is because it represents an additional source of income.

The study found that households that are male headed more likely to be poor than households that are female headed. The findings indicate that households that are male headed are 2 percent more likely to be poor compared to households that are headed by a female. This is in contrast with the hypothesis of this study since it was expected that households that are female headed have are higher probability of being poor compared to households that are male headed. Studies such as Githinji (2011); Geda, et al., (2005) and Oyugi, et al. (2000) found that poverty levels are high households that are female headed as compared to households that are male headed. This study finding differs from the finding of other studies because decision making is done by the spouses despite the fact that the households are headed by the male individuals. Therefore there is a lot of consultation that has to be done regarding the projects being done in the household which in turn lead to time wastage. This could also be due to the fact that since the household is male headed he is therefore in charge of all decisions regarding all the expenses incurred in the household and therefore in charge of all the finances, he might therefore decide to spend the money on himself rather than on the household leading to this household being poor.

The findings indicate that age of the head of the household, property rights and access to credit do not significantly affect the poverty levels.

Table 4 shows the marginal effects of the poverty logit model.

Table 4 : Marginal effects of the poverty logit model

Variable	Marginal effect	Robust standard errors	Z
Engagement in cash crop farming	0.08***	0.01	10.64
Gender of household head	0.02**	0.01	2.09
Primary education	-0.56***	0.00	-6.54
Secondary education	-0.20***	0.01	-17.45
Tertiary education	-0.29***	0.12	-23.11
Age of household age	0.00	0.00	-0.46
Livestock ownership	-0.07***	0.01	-6.28
Access to credit	-0.02	0.01	-1.25
Household size	0.05***	0.00	35.53
Ownership of land	-0.01	0.00	-0.96
Marital status of household head	0.02*	0.01	1.78
Level of household income	-0.00***	6.82e_06	-4.97
Age squared	0.00	0.00	1.37

Source: Authors Computation

*** At 1 percent significant level

** At 5 percent significant level

*at 10 percent significant level

CHAPTER 5: SUMMARY, CONCLUSION AND POLICY RECOMENDATIONS

5.1 Introduction

This chapter presents the summary, draws conclusions and derives policy implications. Section 5.2 summarizes the study while section 5.3 provides the conclusion and policy recommendations 5.4 provide suggestion for further research.

5.2: Summary of the findings

In Kenya, poverty is predominantly a rural phenomenon with rural poverty rates being always higher than urban poverty rates (KIPPRA, 2013). Many rural residents depend on agriculture as their major occupation. It is therefore important to understand the extent to which farming especially cash crop farming affects poverty in rural areas with a view to suggest policy to lower rural poverty rate. The study used the 2005/6 Kenya Integrated Household Budget Survey data to investigate the effect of cash crop farming on rural poverty in Kenya using logit models.

The findings indicate that households that engage in cash crop farming are more likely to be poor although ownership of livestock reduces likelihood of being poor. Household headed by educated heads are also less likely to be poor compared to those headed by uneducated heads. Other factors that significantly affect poverty include: gender of the head of the household, household size, marital status and the level of household income.

5.3 Conclusion and policy recommendations

The analysis of the study shows that 48 percent of the rural population lives below the poverty line. This shows that poverty and especially rural poverty still remains to be an issue of concern in Kenya. The county governments as well as the national government should put in stringent measures to help curb poverty.

The study indicates that households who engage in cash crop farming are 8 percent more likely to be poor than those who do not engage in cash crop farming. Measures should be taken by the government to aid farmers who engage in cash crop farming. This can be through market regulations in terms of price fluctuations in the foreign and domestic markets, access to credit at low interest rates so that the farmers can be able to purchase the farm inputs as well as reduce and subsidize the cost of the farm inputs such as pesticides and fertilizers. There is also need for extensive research on diseases that affect the cash crops grown leading to losses by the farmers.

The government can also ensure that cash crop farmers are paid promptly when they supply their produce so that they do not wait for so long to be paid by processing or importing companies.

5.4 Suggestions of further research

This study has investigated the determinants of rural poverty laying some emphasize on cash crop farming. The findings from the study indicate that households that engage in cash crop farming are more likely to be poor than those that do not engage in cash crop farming. Similar studies can be done in this area with the aim of finding out why farmers that engage in cash crop farming are more likely to be poor compared to those farmers that do not engage in this type of farming.

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