IMPACT OF SMALL SCALE HORTICULTURAL FARMING ON RURAL POVERTY IN KENYA

BY

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DECLARATION

This research paper is my original work and has not been presented for a degree award in any other university.

Signature…… Date……

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

Signature……. Date……

Prof. Tabitha Kiriti Ng'anga

DEDICATION

This research work is dedicated to my parents Benedict and Anastasia Kimau for their support, prayers and encouragement that have gotten me to its completion.

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I would like to thank God for His protection, guidance and giving me the strength throughout my studies until completion.

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ABSTRACT

Various studies on horticultural farming have acknowledged that the horticulture sub-sector provides a great opportunity to escape from poverty through agricultural commercialization. It is expected that horticultural farming will alleviate poverty especially among rural small scale farmers through increased income and generation of employment. This is because small scale farmers dominate the domestic market and a small portion of the export market of horticultural produce. However, with increasing demand for horticultural produce and such great potential in horticultural farming to alleviate poverty, the majority of small scale farmers are still in poverty.

Using the 2005/6 Kenya Integrated Household Budget Survey (KIHBS) data, this paper analyzes the impact of the horticultural sector on rural poverty in Kenya and investigates the determinants of poverty amongst the small scale horticultural farmers. To this end, the study adopts the logit model to estimate both the impact of horticultural farming on rural poverty and the determinants of poverty among small scale horticultural farmers.

The findings indicate that a farmer who engages in horticultural farming is less likely to be poor than a non-horticultural farmer. This is because of the high production value per unit land area, high labor intensity and short production cycles of horticultural crop production as compared to other crops such as staple crops. The study also found that a small scale horticultural farmer is less likely to be poor if he or she is a member of a cooperative society, has a high level of education, has greater access to credit, is of a young age, located in a fertile area among other variables specified in the paper. Policy recommendations advocate for the integration of various policies that focus on provision of different forms of capital, anti-discriminatory laws, community development and policies to offset market failures.

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LIST OF ABBREVIATIONS

EPZA	Export Processing Zone Authority
HCDA	Horticultural Crops Development Authority
KIHBS	Kenya Integrated Household Budget Survey
KIPPRA	Kenya Institute of Public Policy Research and Analysis
KNBS	Kenya National Bureau of Statistics
ROK	Republic of Kenya
WMS	Welfare Monitoring Survey

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CHAPTER ONE: INTRODUCTION

1.0 Background

Kenya has a long history of growing horticultural crops for both the domestic and export market. According to the Export Processing Zone Authority (EPZA), (2005), the horticulture sub-sector of agriculture has grown to become a major foreign exchange earner and employer in Kenya. The main types of horticultural crops grown are fruits, vegetables and cut flowers. However, cut flowers account for about half of Kenya's horticultural exports and therefore, contribute the most foreign exchange in the sub sector.

The main flowers grown in Kenya are roses, carnations, cut foliage, carthhamus, chrysanthemums, arabicum, trelizia, rudbeckia, gypsophilia, lillies, tuberoses among others. The main fruits grown are apples, avocados, bananas, bixa, cashew nuts, coconuts, litchi, mangoes, melons, oranges, passion fruits, pawpaw among others. The main vegetables grown include arrow roots, artichoke, asparagus, basil, beetroot, broccoli, cabbage, cauliflower, celery, capsicum, cassava, carrots, cucumber, garlic, kales, lettuce, mushrooms, parsley, spinach, sweet potatoes and tomatoes (EPZA, 2005). Table 1 summarizes the horticulture crops grown in Kenya:

Table 1: Horticultural crops grown in Kenya

Cut Flowers	**Fruits**	**Vegetables**
Roses	Apples	Arrow roots
Carnations	Avocados	Artichoke
Cut foliage	Bananas	Asparagus
Carthamus	Bixa	Basil
Chrysanthemums	Cashew nuts	Beetroot
Arabicum	Coconuts	Broccoli
Trelizia	Litchi	Cabbage
Rudbeckia	Mango	Cauliflower
Lillies	Melon	Celery
Tuberoses	Orange	Lettuce
	Passion Fruit	
	Paw paw	

Source: EPZA (2005)

The main areas in Kenya that engage in horticultural crop production are found in rural areas and include the following regions; Nyeri, Muranga, Kirinyaga, Machakos, Kiambu, Makueni, Meru, Baringo, Naivasha, Nakuru and Kisii. According to the Republic of Kenya (ROK, 2007), large scale horticultural farmers dominate commercial horticulture especially exports while the majority of horticultural crop growers are small scale farmers who are found in rural Kenya. Horticultural exports are approximately 3% to 5% of total horticultural production whereas the domestic market accounts for 95% to 97% of total horticultural production (ROK, 2007).

According to the Kenya National Bureau of Statistics (KNBS), (2015) the total domestic value of horticultural production in Kenya in 2012 amounted to Ksh.119 Billion with a total production quantity of 12.17 Million Tons whereas the total value of horticultural exports in the same year amounted to Ksh. 89.8 Billion with a total production quantity of 205,800 Tons. Tables 2 and 3 summarize the Domestic and Export Horticultural Production in Volumes and Values between 2012 and 2014;

Table 2: Domestic Horticultural Production – Volumes and Values (2012 to 2014)

Product	**Quantity (Tons)**			**Value ('000') KSH.**		
	2012	**2013**	**2014**	**2012**	**2013**	**2014**
Vegetables	6,170,000	6,175,000	6,300,000	48,191,578	48,627,283	51,191,578
Fruits	4,750,000	4,850,000	4,850,000	43,938,556	49,574,117	49,938,556
Flowers	1,250,000	1,350,000	1,750,000	27,570,600	32,692,268	37,570,600
Total	**12,170,000**	**12,375,000**	**12,900,000**	**119,700,734**	**129,893,668**	**134,700,734**

Source: Republic Of Kenya (2015)

Table 3: Export Horticultural Production – Volumes and Values (2012 to 2014)

Product	**Quantity (Tons)**			**Value ('000') KSH.**		
	2012	**2013**	**2014**	**2012**	**2013**	**2014**
Vegetables	66,400	77,200	70,300	20,225,000	22,923,000	18,780,000
Fruits	31,100	31,100	35,100	4,680,000	4,482,000	5,410,000
Flowers	108,300	105,600	114,800	64,963,000	55,976,000	59,894,000
Total	**205,800**	**213,900**	**220,200**	**89,868,000**	**83,381,000**	**84,084,000**

Source: Republic Of Kenya (2015)

Horticulture production for the domestic market and a small portion of the export market is dominated by small scale farmers (HCDA, 2008). With the increase in demand for horticultural produce both domestic and globally, it is expected that horticultural farming will alleviate poverty among the rural small scale farmers through increased income and generation of employment (Weinberger and Lumpkin, 2007). However, despite horticultural farming occurring predominantly in the rural areas, poverty remains widespread in these rural areas more than in the urban areas.

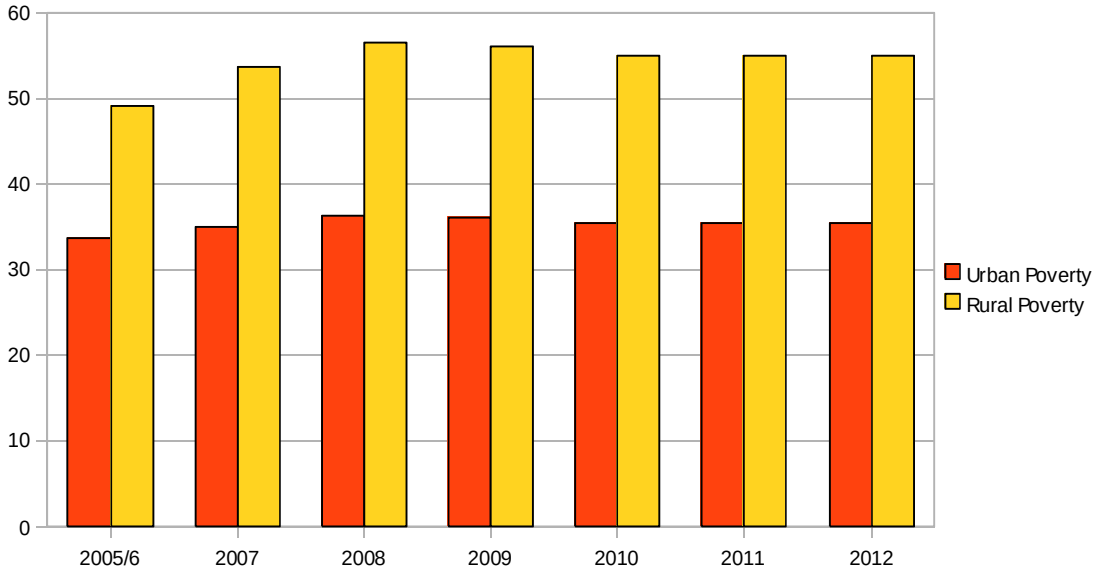
Sen (1983) defines poverty as an absolute notion in the space of capabilities but often takes a relative form in the space of commodities or characteristics. Poverty is also defined as the lack of resources necessary to permit participation in the activities, customs and diets commonly approved by society (Townsend, 1979). In Kenya, poverty has been widespread and still remains a huge challenge with overall poverty levels in 1994 being estimated at 40.25 per cent before taking an upward trend with poverty levels in 2012 being estimated at 49.8 per cent according to the Kenya Institute of Public Policy Research and Analysis (KIPPRA, 2013). Rural poverty levels have always been higher than urban poverty levels. According to the Kenya Integrated Household Budget Survey (KIHBS, 2005/2006) rural poverty rate was estimated at 49.1 per cent as compared to the urban poverty rate estimated at 33.7 per cent in 2005. Table 4 and Figure 1 show comparative rural and urban poverty rates in Kenya between 1994 and 2012;

Table 4: Poverty rates in Kenya

Year	**National poverty levels**	**Rural poverty levels**	**Urban poverty levels**
1994	40.25	46.75	28.95
1997	53.32	52.93	49.2
2005/6	45.9	49.1	33.7
2007	48.8	53.72	34.93
2008	50.8	56.43	36.22
2009	50.5	56.03	36.03
2010	49.8	55.02	35.55
2011	49.7	54.97	35.52
2012	49.8	54.98	35.53

Source: Welfare Monitoring Survey (WMS) 1994 and 1997; KIHBS 2005/6; KIPPRA 2013

Figure 1: Poverty rates chart in percentage (2005 to 2012)



1.1 Problem Statement

The first Millennium Development Goal of eradicating extreme poverty and hunger depends on raising the productivity of agriculture especially in developing countries (Von Braun et al., 2004). The horticulture sector has an important role to play in achieving this goal. Horticultural production provides a great opportunity to escape from poverty through agricultural commercialization in the different market pathways due to its high labour intensity, high production value per unit land area and short production cycles (Hichaambwa et al., 2015). It is, however, argued that high quality standards set by international regulation bodies on horticultural produce will act as trade barriers for developing countries such as Kenya that depend on horticulture farming to alleviate poverty (Maertens and Swinnen, 2006). Despite this argument, there has been increased demand for horticultural produce both locally and internationally.

Diversification into horticultural farming can contribute to poverty reduction through generation of employment and wages in rural areas where labour is in plenty hence enabling expansive and equitable growth (Weinberger and Lumpkin, 2007). Horticultural farming provides greater opportunity of alleviating poverty than non-horticultural farming or cereal crop farming (McCulloch and Ota, 2002). This is attributed to the production of horticultural crops using more labour and of high

production value per unit land area as compared to production of staple crops such as maize. Therefore, greater employment opportunities found in horticulture farming result in greater incomes for poor households. Women have also taken advantage of the labour market opportunities offered by horticultural farming. The high-value crop exports are female intensive industries where women are engaged in most aspects of production and processing (McCulloch and Ota, 2002).

The commercialization of horticultural farming has contributed to the expansion of the rural economy. However, despite the increased demand for horticultural produce globally that has led to area expansion of cultivated land, it has not resulted in yield increases especially in the developing countries (Weinberger and Lumpkin, 2007). It is also evident from the available household surveys that majority of the small scale horticulture farmers are still in poverty. With such great potential in horticultural farming to alleviate poverty, why are the majority of the small scale farmers still in poverty? This study seeks to analyze the impact of horticultural farming on rural poverty in Kenya and to establish the determinants of poverty amongst the small scale horticultural farmers.

1.2 Objectives of the Study

The main objective of this study is to analyze the impact of small-scale horticultural farming on rural poverty in Kenya. The specific objectives are;

- To analyze the impact of the horticultural sector in general on rural poverty in Kenya.
- To establish the determinants of poverty amongst small scale horticultural farmers.
- To make policy implications based on the findings of this study.

1.3 Significance of the Study

This study seeks to make an analysis of the impact of horticultural farming on rural poverty and determine its contribution to poverty alleviation. It will also seek to establish the determinants of poverty among small scale horticulture farmers that will assist policymakers come up with appropriate policies that will enable them achieve the newly formed sustainable development goal of ending poverty in all its forms everywhere. This research will equally add to the existing literature on poverty related issues.

1.4 Organization of the study

The following chapters are organized as follows; chapter two gives a review of literature on studies done on this subject, followed by chapter three that gives the conceptual framework and methodology. Chapter four discusses the findings of the study and finally chapter five gives the summary and conclusion together with the policy implications.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter looks at existing literature that focuses on horticultural farming and poverty. It reviews the available theoretical and empirical literature on this subject matter.

2.1 Theoretical literature

In an attempt to understand poverty and its causes; various economic theories have been used. This section looks at both the traditional and contemporary economic theories on poverty.

2.1.1 Classical theory on poverty

This is one of the traditional economic theories and it includes the prominent works of Adam Smith and David Ricardo. This theory assumes that the outcome of the forces of demand and supply in the market place are efficient and hence wages accurately reflect individual productivity in an economy (Davis, 2015). Therefore, under this theory, poverty is mainly seen as a consequence of poor individual choices, differences in underlying genetic abilities and individual characteristics. Some of the individual characteristics identified range from low levels of education, lack of industrious work ethic and competitive skills (Rank et al., 2003). Generally, individuals are ultimately responsible for being poor.

This theory further explains that beyond a minimum level, state intervention aimed at reducing poverty is viewed as a source of economic inefficiency. Welfare programmes are considered to cause or enhance poverty through welfare dependence. As a result, this theory provides a foundation for laissez-faire policies and discourage re-distributive policies (Esping-Andersen, 1990). To address poverty, majority of the policy prescriptions here aim to increase the productivity of deprived individuals in order for them to become part of the labour force and earn income as a way out of poverty.

2.1.2 Neoclassical theory on poverty

This theory builds on the classical theory and mainly includes the work of Alfred Marshall. Neoclassical theory points out the role of unequal initial endowments of talents, skills and capital which all determine the productivity of an individual as the causes of poverty. Contrary to the classical theory, neoclassical theory gives a wider explanation of poverty as being beyond the control of an individual. It identifies market failure, moral hazard, adverse selection and incomplete information as further aggravates of poverty (Davis, 2007).

The neoclassics, however, agree with the classical thinkers on minimal government intervention. Both these theories over-emphasize the money aspect of poverty, the individual as opposed to the group and a minimal role for the government (Davis, 2015). The neoclassical theory also does not encourage policies of redistribution rather policies that increase the productivity of an individual so as to alleviate poverty.

2.1.3 Keynesian theory on poverty

This being another traditional economic theory attributed to John Maynard Keynes, it recognizes that underdevelopment is the main cause of poverty portrayed through unemployment. According to this theory, poverty is considered largely involuntary and caused mainly by unemployment. Besides market distortion, broad underdevelopment in the form of poor levels of human capital, business capital, natural capital and public institutional capital cause unemployment which in turn causes poverty (Sachs, 2005). Keynesian theory therefore, emphasizes government intervention which is key in promoting sustainable economic growth, development and stabilization to tackle involuntary unemployment. The policy prescriptions here mainly focus on provision of capital goods such as education so as to increase human capital, infrastructure to increase productive capacity and market development which all ensure steady employment resulting in poverty reduction.

2.1.4 Marxian theory on poverty

This theory builds on the views of Karl Marx which attribute the role of classes in society and other political issues in explaining the causes of poverty. It puts across the fact that capitalism, related social and political factors based on class division cause poverty through unemployment. Under this school of thought, the market is perceived

to be inherently dysfunctional and that poverty can only be reduced through strict regulation of the market especially the labour market (Davis, 2015). Together with the Keynesian theory, this theory assigns a significant role to the government in the form of minimum wage laws. The main policies here are anti-discrimination laws and labour market reforms that overcome unemployment and promote higher wages thereby reducing poverty.

2.1.5 Contemporary economic theories on poverty

In contrast to the specified traditional economic theories on poverty, contemporary economic theories on poverty such as the Social Exclusion Paradigm, view poverty as non-participation in consumption, production, political engagement and social interaction (Morazes and Pintak, 2007). The European Union (2004) defines social exclusion as a process through which individuals or groups are wholly or partially excluded from full participation in the society in which they live. The principle of inequality is key to this theory in determining the income and non-income dimensions of poverty. However, the social exclusion view has been criticized to be open to different interpretations due to the difficulties faced when measuring the concept of lack of social capital; and also difficulties in addressing it in terms of policy, hence its use and further analysis have been neglected in poverty literature (Davis, 2015).

2.2 Empirical literature

Muriithi and Matz (2014) investigate the effects of small scale vegetable commercialization in Kenya through different market pathways on household welfare measured by income and asset ownership. They analyzed panel household survey data collected from five districts representing approximately 50% of the small scale commercial horticultural farmers in Kenya. Using regression estimation, the study found a positive relationship between the commercialization of vegetables through the export market channel and household income, but not for asset holdings. On the other hand, contribution to household welfare through the domestic market pathway appears stronger with respect to asset ownership than income. The authors conclude that these results indicate that the commercialization of vegetables through the different market pathways has mixed effects on household welfare. However, it appears that regardless of the market channel used, household welfare improves either through increased income or asset holding.

Maertens and Swinnen (2006) investigate the effect of introduction of high quality standards on vegetable exports in Senegal. It is expected that high standards will act as trade barriers for developing countries and cause increased poverty. The study uses company and household survey data from the vegetable export chain in Senegal. The authors found that exports have grown sharply despite increasing standards, resulting in income gains and poverty reduction. They further explain that the tightened food standards caused a shift from small holder contract-based farming to large-scale integrated estate production, changing the means through which poor households benefit; that is through labor markets instead of product markets. The impact on poverty reduction is stronger as the poorest benefit relatively more from working on large-scale farms than from contract farming.

McCulloch and Ota (2002) sought to examine the linkage between export horticulture and poverty reduction in Kenya. The study makes use of household survey data to compare the incomes of households involved in export horticulture with those which are not. The findings of this study are that households that engage in export horticulture are better off than those which do not especially in the rural areas. Furthermore, farmers that engage in horticultural crops production often earn higher incomes than those who engage in cereal crops production. However, the authors also found that there exists some constraints faced by rural households in determining participation in the sector. These constraints mainly include post-harvest facilities, managerial and marketing skills.

Maertens and Verhofstadt (2012) analyze the indirect effects of a boom in horticultural exports on primary school enrollment and female off-farm wage employment. Using household survey data and an instrumental variable probit model, the authors found that female wage employment in the horticulture export industry had a positive and significant impact on primary school enrollment. Other factors that they found to affect primary school enrollment are household characteristics, village factor and individual child characteristics. Their study also shows the importance of the labour market especially for women in alleviating poverty by increasing the total household income.

Hichaambwa et al. (2015) assess the extent to which small holder horticulture contributes towards poverty reduction as compared to the maize sub sector in Zambia where most of the public resources in the agriculture sector are spent. The study also uses household survey data and a regression model to estimate the comparative household income impacts of participation in horticulture and maize markets. The study found that small holder horticulture market participation has higher income impacts than that of maize. Furthermore, female headed households and those with relatively younger heads are found to be more willing to participate in horticultural production.

Asfaw (2008) tests whether food safety and production oriented standards imposed by developed countries can affect the welfare of small scale horticulture producers in developing countries who are the main target in poverty reduction strategies. Using data collected by means of farm household surveys and application of various economic models including the two-stage Poisson regression model, the author finds that small scale farmers face more difficulties in complying with the standards as compared to the large scale farmers in terms of information, capital and labour. However, the study further suggests that the standards do not eliminate small holder farmers as a whole but discriminates within the group. It is the asset poor who may be left out from the export market chains but the rest of the small scale farmers who are able to invest in and adopt the standards will be able to enjoy higher net income and stronger bargaining positions with exporters.

Chege et al. (2015) assess the impact of export horticulture farming on the welfare of small holder farmers in Kenya in terms of food security using the Propensity Score Matching Method. They find factors such as regional climatic differences, marketing conditions and intra household income distribution patterns play a role in determining whether a shift from food production for home consumption to production for the market is a way out of poverty and a means to enhance food production.

Rao et al. (2010) analyze the effects of participation in supermarket channels on farm household income and poverty reduction in Kenya. The study uses endogenous switching regression on a survey of vegetable farmers in Kenya. The results from the study suggest that supermarkets can contribute to income growth and poverty

reduction in the small and rural farm sector. However, to benefit from this on a larger scale would require broader infrastructure development as well as targeted institutional and policy support so as to minimize disparities and marginalization of small holder farmers.

2.3 Overview of Literature Review

The review of theoretical literature gives evidence that there is no single theory that sufficiently explains the causes of poverty due to its complex nature and the different aspects of the dynamics surrounding it. However, there are three main determinants of poverty that can be identified from the theoretical literature; individual characteristics, the market system and underdevelopment. The theoretical analysis implies the integration of various policies drawn from different schools of thought that focus on provision of forms of capital, anti-discriminatory laws, community development and policies to offset market failures.

From the empirical studies, it is possible to identify the factors affecting the impact of horticultural farming on poverty especially rural poverty. These factors include; market channels, individual characteristics such as gender, level of education and age, high quality standards and access to credit and capital facilities. This study therefore, works with these identified variables to examine the impact of horticultural farming on rural poverty.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This Chapter looks at the method of data collection and analysis. It also outlines the conceptual framework and the model that will be used to carry out this study.

3.1 Conceptual Framework

In order to address objective one and two specified in chapter one, the study comes up with the following conceptual frameworks presented in Figures 2 and 3 from which the model is developed. Figure 2 illustrates the impact of horticultural farming on poverty. The main explanatory variables here look at the effect of being a horticultural farmer versus a non-horticultural farmer on the welfare of a household. This framework looks at the horticultural sector in general as a determinant of alleviating poverty.

Figure 3 outlines the determinants of poverty amongst horticultural farmers. It looks at the inherent factors that cause poverty amongst horticultural farmers. These factors are mainly demographic in nature.

Figure 2: Conceptual Framework 1

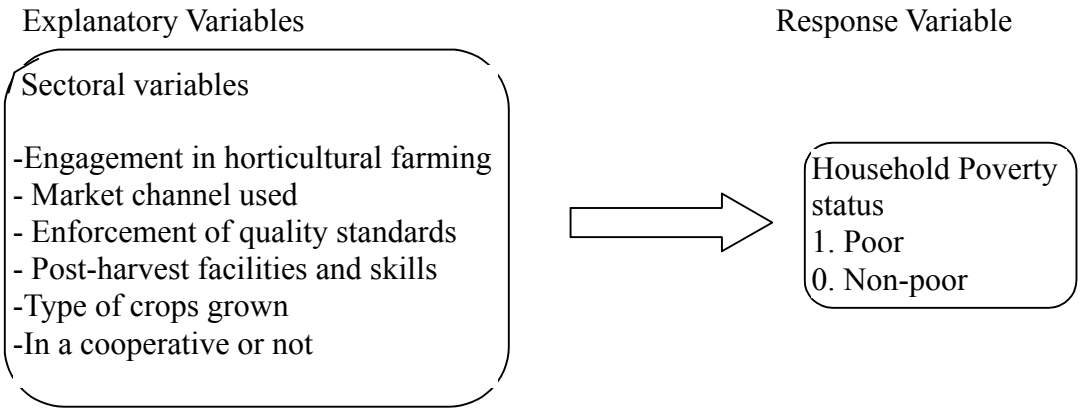
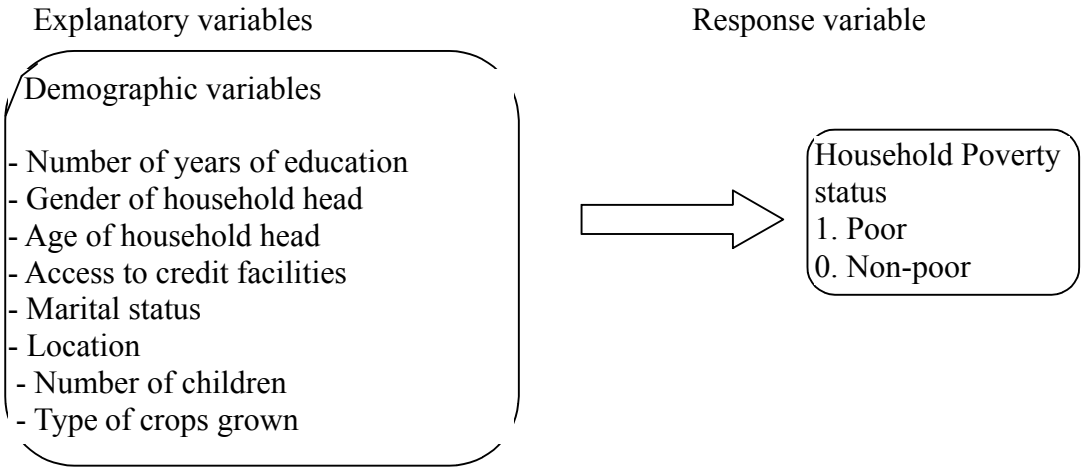


Figure 3: Conceptual Framework 2



Source: Author's formulation

3.2 Model Specification

This study adopts the logit model to estimate both the impact of horticultural farming on rural poverty and the determinants of poverty among small scale horticultural farmers. This is because the logit model relates to binary outcomes. Our response variable, poverty, which the model will estimate is observed to generate a binary outcome. Poverty which is our dependent variable (P*) generates a binary outcome by taking value 1 if a household is poor and 0 if otherwise as shown below;

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

To come up with the model, let us assume there is a latent variable that generates a binary outcome. Let this latent variable that is unobserved be P*. Households with a high P* will be observed as poor while those with a low P* will be observed as non-poor. The latent variable is assumed to be linearly related to the independent or explanatory variables as follows;

$$P_i^* = X_i\beta + e_i \quad \text{.....Equation 1}$$

The logit of a number P_i between 0 and 1 is given by the following formula (Wooldridge, 2013):

$$\text{Logit}(P_i) = \log\left[\frac{P_i}{1 - P_i}\right] \text{.....Equation 2}$$

Equating the logit formula in equation 2 to the linear predictor function in equation 1 we obtain

$$\text{Ln}(P_i^*) = \log\left[\frac{P_i^*}{1 - P_i^*}\right] = X_i\beta + e_i \text{.....Equation 3}$$

Equation 3 which is the Poverty equation to be estimated can also be written as

$$\text{Ln}(P_i^*) = \log\left[\frac{P_i^*}{1 - P_i^*}\right] = \beta_0 + \beta_1 X_i + \text{.....} \beta_k X_{ki} + e_i$$

In order to estimate the first objective, which is the impact of horticultural farming on rural poverty, the poverty equation to be estimated can be written as;

$\text{Ln}(P) = \beta_0 + \beta_1 \text{HortF} + \beta_2 \text{MktChan} + \beta_3 \text{EnfStd} + \beta_4 \text{PHF} + \beta_5 \text{Crop} + \beta_6 \text{Cop} + e_i$….Equation 4

Where:

P = Poverty

HortF = Dummy variable indicating horticultural farmer versus non-horticultural farmer.

MktChan = Dummy variable indicating Market channel used; Domestic versus Export market.

EnfStd = Dummy variable indicating Enforcement of quality standards or not.

PHF = Dummy variable indicating availability of post-harvest facilities or not.

Crop = Dummy variable indicating type of crop grown; Horticultural versus non-horticultural crops

Cop = Dummy variable indicating farmer in a cooperative society or not

ß = Parameters

e = Error term

To estimate our second objective, which is estimating the determinants of poverty among small scale horticultural farmers, the poverty equation to be estimated can be re-written as;

$Ln(P) = ß_0 + ß_1Educ + ß_2Gender + ß_3Age + ß_4Credit + ß_5Marital + ß_6Child + ß_7Location + ß_8Crop + e_i$.....Equation 5

Where:

P = Poverty

Educ = Number of years of education.

Gender = Dummy variable indicating gender of household head.

Age = Age of household head.

Credit = Dummy variable indicating accessibility to credit facilities or not.

Mar = Dummy variable indicating marital status.

Child = Number of children in the household.

Location = Location of the small scale horticultural farmer.

Crop = Type of crop grown by the horticultural farmer.

The parameters or regression coefficients of Equation 4 and 5 are estimated using the maximum likelihood method of estimation.

3.3 Pre-estimation tests

These tests were carried out to establish whether the model is consistent or not. The identified variables were subjected to diagnostic tests for heteroskedasticity, autocorrelation, multicollinearity and model specification tests.

3.4 Definition of variables

The response variable in our logistic regression is a dichotomous variable of whether a household is poor (1) or non-poor (0). The explanatory variables on the other hand are; the market channel used, engagement in horticultural farming, enforcement of quality standards, post-harvest facilities and skills, level of education of household head, gender of household head, age of household head, type of crop grown and access to credit. The study analyzed how these variables affect the poverty status of a household.

Engagement in horticultural farming

Small-scale horticultural farmers were expected to be less poor than other rural farmers who engage in non-horticultural farming. This is because of the high production value per unit land area, high labor intensity and short production cycles of horticultural crop production as compared to staple crop production (Hichaambwa et al. 2015). This translates to higher incomes from frequent harvests for horticultural farmers. McCulloch and Ota (2002) are in agreement with this expectation that horticultural farming yields higher incomes than cereal crop farming.

Market channel used

Horticultural farming produces high value produce in the market as compared to non-horticultural farming (Hichaambwa et al. 2015). This is due to the increased demand for horticultural produce both locally and internationally. It was expected that a household that engages in commercial horticultural farming through the domestic or export market channel reduces its probability of being poor than a non-horticultural farmer. However, according to Muriithi et al. (2014) and McCulloch et al. (2002) the extent of reduction in poverty depends on the market channel used. They found that commercialization through the export market will yield greater income than through the domestic market. Therefore, it was expected that a household would be less likely to be poor if they use the export market than a household that uses the domestic market.

Enforcement of quality standards

Horticultural produce is affected more by high quality food standards as compared to non-horticultural produce. It was therefore, expected that introduction of international regulations and enforcement of high quality standards on horticultural exports would increase the probability of a household to be poor. This is because the high standards act as trade barriers for developing countries and hence increase their poverty levels. However, Maertens and Swinnen (2006) in their study found that exports increased sharply in Senegal resulting in income gains and poverty reduction despite the standards put in place. They explain this unusual phenomenon to be caused by a shift from small-scale contract-based farming to large-scale integrated estate production. Therefore, the small-scale horticultural farmers benefit from employment income from working in the estates instead of taking their products which might not meet the set standards directly to the market.

Post – harvest facilities and skills

Horticultural produce requires adequate post-harvest facilities such as cold rooms due to its highly perishable nature as compared to non-horticultural produce. It was expected that small-scale horticultural farmers who do not have post-harvest facilities and skills at their disposal are more likely to be poor than non-horticultural farmers. This is because lack of post-harvest facilities such as cold rooms and skills such as managerial and marketing skills, locks out small-scale rural farmers from participation in horticultural farming. McCulloch and Ota (2002) acknowledge the existence of such constraints faced by rural households in determining participation in the horticultural sector and thereby influencing the poverty status of these small-scale farmers.

Type of crops grown

Horticultural farmers grow fruits, vegetables and flowers which are high value crops as compared to non-horticultural farmers such as cereal crop farmers (Hichaambwa et al. 2015). It was therefore expected that horticultural farmers are better placed to increase their incomes through horticultural farming and hence become less poor than the non-horticultural farmers. Furthermore, amongst the horticultural farmers, there are crops that yield higher incomes than others. For instance, flower farmers yield more income from flower exports than fruit and vegetable farmers. It was thus expected that flower farmers were less likely to be poor than fruits and vegetable farmers.

Member of a cooperative society or not

Non-horticultural farmers such as the cereal crop farmers usually belong to cooperative societies unlike horticultural farmers (KNBS, 2015). The co-operatives will enable the horticultural farmers benefit from the bargaining power of their strength in numbers and hence earn more income. It was therefore expected that if horticultural farmers belong to a cooperative society, they would be less likely to be poor than those who are not in a cooperative society.

Number of years of education

It was expected that the higher the level of education of the household head, the less likely that such a household would be poor. This is because higher education enables

the household head to make informed decisions and avoid poor individual choices (Davis, 2015). According to the classical theory by Adam Smith, some of the individual characteristics such as low levels of education, lack of industrious work ethic and competitive skills are responsible for households being poor. Therefore, lack of any formal education leads to a higher probability of being poor.

Gender of household head

A male-headed household was expected to have a lower probability of being poor than a female headed household. This is because the male household heads are believed to be better advantaged when it comes to income making opportunities as compared to their female counterparts who are perceived to possess less skills. However, Hichaambwa et al. (2015) found that female headed households are more willing to participate in horticultural production than the male headed households. Therefore, there is a higher probability of escaping poverty in a female headed household that engages in horticultural farming.

Age of the household head

It was expected that the older the household head the higher the probability of that household being poor. This is because younger household heads are willing to take risks and to compete for income generating opportunities. Hichaambwa et al. (2015) also found that relatively younger heads are more willing to participate in horticultural production than older household heads. The younger heads are able to acquire necessary skills much faster than older heads that will enable them engage in income generating activities that would reduce their level of poverty.

Access to credit

Lack of access to credit facilities by households increases their probability of being poor. Credit facilities enable farmers access capital required to acquire assets and key inputs of production that would enable high levels of output, income and savings. The neoclassical theory points out the role of unequal initial endowments of talent, skills and capital as being major causes of poverty (Davis, 2015). Therefore, the easier a household is able to access credit, the lower the chances of being poor.

Marital Status

It was expected that if a small scale horticultural farmer is married, it increases their probability of being poor. This is because he or she needs to provide for the other partner in the marriage and the children if there are any hence increasing the probability of the household to be poor.

Location

Some horticultural farmers are located in areas where their crops do not do so well. Areas such as Machakos have adverse climatic conditions and poor soils. It was therefore expected that farmers in such areas are more likely to be poor due to the low yields as compared to those in fertile areas.

Number of children

A household with a higher number of children can either be poorer or less poor than a household with fewer number of children. This is because more children will consume greater income of a household and hence become poorer than those who are in a household with fewer children. On the other hand, a household with more children can be less poor than that with fewer children. This is because the children can be a source of labor and hence earn more income for the household. Therefore, it was expected that a household with many children can either be poor or less poor than a household with fewer children.

Table 5 summarizes the defined variables giving the expected outcome from each variable.

Table 5: Definition of the explanatory variables

Variable	Operational measure	Expected sign
Engagement in horticultural farming	1 if not 0 if otherwise	-
Market channel used	1 if none, 0 if otherwise 1 if domestic market, 0 if otherwise	-
Enforcement of quality standards	1 if yes 0 if otherwise	+/-
Post-harvest facilities and skills	1 if none 0 if otherwise	-
Type of crop grown	1 if non-horticultural crops 0 if horticultural crops 1 if fruits and vegetables 0 if cut flowers	-
Member of a cooperative or not	1 if not 0 if otherwise	-
Number of years of education	1 if none, 0 if otherwise 1 if up to eight years, 0 if more	-
Gender of household head	1 if male-headed, 0 if otherwise	+/-
Age of household head	Age of household head in years	+
Access to credit	1 if yes, 0 if otherwise	-
Location	1 if unfertile farming land 0 if otherwise	+
Number of children	1 if many children 0 if otherwise	+/-
Marital status	1 if married 0 if otherwise	+

Source: Author's own

3.5 Data Sources

This study uses the KIHBS 2005/6 data. This data was collected to measure the poverty levels in Kenya. The sampling frame composed of 1,800 clusters with a total sample of 13,430 households consisting of 8,610 rural households and 4,820 urban households.

The study also used data from the 1994 and 1997 Welfare Monitoring Surveys and the 2013 Kenya Institute of Public Policy Research and Analysis Economic Report.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents the findings of this study. It gives the regression results obtained by estimating the two equations and the interpretation of these results.

4.1 Descriptive Statistics

In this section the characteristics of the sample used in this study are analyzed. Table 6 presents the descriptive statistics which give an in depth analysis of the variables in terms of mean and standard deviation. It is observed that of the 8,610 rural households sampled, about 52% of them are poor. About 45% of these rural households are horticultural farmers, while the remaining 55% are non-horticultural farmers. Majority of the horticultural farmers are fruits and vegetable farmers standing at 88%. Slightly over 10% of these rural households are flower farmers.

From the sample surveyed it is observed that 76% of the households use the domestic market channel to sell their produce while 10% export their produce. About 14% are found to be subsistent farmers who do not sell their produce in any market. It was found that about half of the households are members of a cooperative society with slightly over 30% possessing post-harvest facilities and skills. However, only 10% of the households have access to credit. About 45% of the rural households are found to be located in fertile areas that produce high yields.

Majority of the household heads have primary education (62%) with 17% having no education at all. About 72% of the households are male-headed households with the average age of the household head being 47 years. Almost 90% of the household heads were married with each household having an average of 5 children. Table 6 gives the descriptive statistics in detail.

Table 6: Descriptive Statistics

Variable	Observations	Mean	Standard deviation
Independent variable			
Poverty	8,610	0.52	0.47
Independent variable			
Horticultural farmer	8,610	0.45	0.50
Non-horticultural farmer	8,610	0.55	0.50
Domestic market	8,610	0.76	0.45
Export market	8,610	0.10	0.37
No market	8,610	0.14	0.58
Possess post-harvest facilities and skills	8,610	0.32	0.43
Member of cooperative society	8,610	0.50	3.29
Primary education	8,610	0.62	0.48
Secondary education	8,610	0.21	0.45
No education	8,610	0.17	0.38
Flower farmer	8,610	0.12	5.32
Fruits and vegetable farmer	8,610	0.88	1.64
Male household head	8,610	0.72	0.45
Age of household head	8,610	46.63	14.80
Access to credit	8,610	0.10	0.30
Located in fertile area	8,610	0.45	0.50
Number of children	8,610	5.38	3.09
Marital status	8,610	0.89	0.55

Source: Authors computation

4.2 Diagnostic test results

The pre-estimation tests carried out on the variables and the model revealed absence of heteroskedasticity, autocorrelation and multicollinearity among the variables while the model was found to be consistent and a good measure of the estimates. The diagnostic tests that were carried out include the Breush-Pagan test for heteroskedasticity, the Durbin-Watson test for autocorrelation and test for multicollinearity that are specified as follows;

1. **Test for heteroscedasticity**

Breusch-Pagan test

chi2(1) = 6.82
Prob > chi2 = 0.09

From the diagnostic results of Breusch-Pagan test presented above with a p-value of 0.09 which is greater than the alpha at 5%, we can then conclude that there is the absence of heteroscedasticity in the model and as such the model is fit.

2. **Test for autocorrelation**

Durbin-Watson Statistic = 1.99797

The Durbin-Watson result shown above suggests that there is no form of autocorrelation since the test result (1.99797) falls between 1.5 and 2.5 which is the threshold for autocorrelation.

3. **Test for multicollinearity using the Variance Inflation Factor (VIF)**

VARIABLE	VIF	1/VIF
enforcemen~d	4.38	0.228453
postharves~s	3.81	0.262247
engagement~g	2.69	0.371847
ageofhhhead	1.03	0.969147
maritalsta~s	1.02	0.976899
marketchan~d	1.02	0.983225
noofchildren	1.01	0.985637
noofyearso~n	1.01	0.994208
genderofhh~d	1	0.996234
memberofco~y	1	0.998036
accesstocr~t	1	0.998915
location	1	0.999009
typesofcro~n	1	0.999193
Mean VIF	1.61	

Source: Author's computation

From the test result above, all the variables have a variance inflation factor which is less than 10 including the mean VIF. This means that the model does not have a problem of multicollinearity and therefore fit as a good measure of the estimates.

4.3 Econometric Results

This section gives the regression results of the estimated equations and the interpretation of the observed results. The study used the logistic regression to analyze the impact of horticultural farming on rural poverty and to estimate the determinants of poverty amongst small scale horticultural farmers. The dependent variable of both the estimated equations is a binary variable of whether a household is poor or not.

4.3.1 Analysis of impact of horticultural farming on rural poverty

The marginal effects and the regression coefficients of the first estimated equation analyzing the impact of horticultural farming on rural poverty are presented in Table 7. These results indicate the relationship between the explanatory variables specified in the model and the response variable which is poverty.

Table 7: Regression results of the impact of horticultural farming on rural poverty

VARIABLE	COEFFICIENTS	MARGINAL EFFECT	Z
Horticultural farmer dummy	-0.022	-0.005	-10.56
Non-horticultural farmer dummy	0.054	0.140	2.62
Domestic market dummy	-0.210	-0.008	-2.94
Export market dummy	-0.372	-0.053	-2.82
No market dummy	0.078	0.190	2.25
Enforcement of quality standards dummy	0.019	0.023	1.98
Absence of quality standards dummy	-0.094	-0.036	-2.01
Possession of post-harvest facilities and skills	-0.030	-0.083	-2.26
Lack of post-harvest facilities and skills	0.243	0.135	1.98
Horticultural crops grown	-0.147	-0.058	-2.05
Staple crops grown	0.280	0.143	1.97
Member of cooperative society dummy	-0.030	-0.078	-2.32
Not a cooperative society member dummy	0.006	0.249	1.99
1 percent level of significance (Z*) 5 percent level of significance (Z*)	= 2.575 = 1.96		

Source: Author's computation

The findings indicate that households that engage in horticultural farming are less likely to be poor than those that do not engage in horticultural farming. The results show that households that do not engage in horticultural farming are 14% more likely to be poor than those in horticultural farming. Hichaambwa et al. (2015) also found that small scale horticultural production has higher income than maize production when they compared the horticultural and maize sector in Zambia. This study also hypothesized that engagement in horticultural farming reduces rural poverty and the results obtained indicate the same. The results show that the effect of engagement in horticultural farming on rural poverty is highly significant. This is because of the high production and market value per unit land area, high labour intensity and short production cycles of horticultural crop production as compared to staple crop production. This translates to increased employment income and generation of higher incomes from frequent harvests.

The market channel used is found to have a negative relationship with poverty. This means that a farmer who engages in commercial farming is less likely to be poor than a farmer who engages in subsistence farming. The results show that a subsistence farming household is 19% more likely to be poor than a household using the domestic or export market who are 0.8% and 5.3% respectively less likely to be poor. Muriithi and Matz (2014) also found a positive relationship between commercialization of vegetables through the export market channel and household income. McCulloch and Ota (2002) also found that the export market generates higher income than the domestic market. Hichaambwa et al. (2015) also found that horticultural farming produces high value produce in the market as compared to non-horticultural farming. This study hypothesized that a household will be less likely to be poor if they use the export market rather than the domestic market. This is because of the high demand and high prices of horticultural crops in the export market and thereby higher incomes for the farmers which reduces their probability to be poor. The results show that using a market channel whether domestic or export is highly significant on the rural poverty levels.

Enforcement of quality standards is found to be positively related to poverty. This means enforcement of quality standards increases the likelihood of a household to be poor. Horticultural produce is affected by high quality food standards more than non-horticultural produce. From the results, 2.3% of households are more likely to be poor

with enforcement of quality standards. Asfaw (2008) found that small scale farmers face more difficulties in complying with the standards as compared to the large scale farmers in terms of capital, labour and information. However, Maertens and Swinnen (2006) found that exports in Senegal grew sharply despite increasing standards. This study hypothesized a mixed effect of enforcement of quality standards on poverty. This is because the quality production standards do not eliminate all small scale farmers but discriminate only those who are asset poor and leaves out the rest who are able to invest in and adopt the standards to enjoy higher incomes and reduce their chances of being poor. Therefore, enforcement of quality standards significantly affects rural poverty.

Possession of post-harvest facilities and skills reduces the likelihood of a household being poor as indicated by the findings. The results show that there is a negative relationship between poverty and possession of post-harvest facilities and skills. A household is found to be 13.5% more likely to be poor if it lacks post-harvest facilities and skills. Horticultural produce requires more post-harvest facilities such as cold rooms as compared to non-horticultural produce. McCulloch and Ota (2002) found that existence of such constraints faced by rural households determines their participation in horticultural farming thereby influencing their poverty status. As a result, rural households are more likely to be poor if they are unable to engage in horticultural farming due to lack of post-harvest facilities and skills. Therefore, the possession or lack of post-harvest facilities and skills significantly affect the welfare of a household.

The findings indicate that crops grown by households engaged in horticultural farming reduce their likelihood of being poor due to their high value as compared to crops grown by non-horticultural farming households. The results show that households growing non-horticultural crops are 14.3% more likely to be poor than households growing horticultural crops. Hichaambwa et al. (2015) acknowledged that fruits, vegetables and more especially flowers have a higher value than cereal crops. Therefore, horticultural farmers especially flower farmers are better placed to increase their incomes and reduce their likelihood to be poor as compared to non-horticultural farmers. The type of crop grown thereby affects poverty levels significantly.

Being a member of a cooperative society has a negative relationship with poverty.

This means the likelihood of a household to be poor is reduced if they belong to a cooperative society. As indicated by the results, a household is 24.9% more likely to be poor if they are not a member of a cooperative society. According to KNBS (2015), non-horticultural farmers such as cereal crop farmers are found to be more in cooperative societies than horticultural farmers. Therefore, horticultural farmers are more likely to be poor if they do not belong to a cooperative society. This is because the cooperative will enable them benefit from the bargaining power of their strength in numbers and thereby increase their income and reduce their chances of being poor. As shown by the results, being a member of a cooperative society significantly affects rural poverty.

4.3.2 Determinants of poverty amongst small scale horticultural farmers

The marginal effects and the regression coefficients of the second estimated equation analyzing the determinants of poverty amongst small scale horticultural farmers are presented in Table 8. These results indicate the relationship between the explanatory variables specified in the model and the response variable which is poverty.

Table 8: Regression results of determinants of poverty among small scale horticultural farmers

VARIABLE	COEFFICIENTS	MARGINAL EFFECT	Z
Primary education dummy	-0.316	-0.047	-3.16
Secondary education dummy	-0.731	-0.077	-7.17
No education dummy	0.252	0.035	2.63
Female household head dummy	1.098	0.078	1.69
Male household head dummy	-0.249	-0.038	-2.23
Age of household head	0.014	0.02	1.78
Access to credit dummy	-0.320	-0.035	-2.68
Lack of access to credit dummy	0.215	0.039	2.33
Married dummy	0.388	0.066	0.43
Unmarried dummy	-0.136	-0.018	-0.93
Household size	0.012	0.002	1.98
Located in fertile area dummy	-0.077	-0.043	-3.47
Located in unfertile area dummy	0.215	0.011	2.62
1 percent level of significance (Z*) 5 percent level of significance (Z*)		= 2.575 = 1.96	

Source: Author's computation

Education reduces the likelihood of being poor as indicated by the findings in Table 8. The higher the level of education of the household head the less likely the household will be poor. The results show that a household is 3.5% more likely to be poor if the head has no education and is 4.7% and 7.7% less likely to be poor if the head has primary and secondary education respectively. Davis (2015) explains that higher education enables the household head to make informed decisions and avoid poor individual choices. Furthermore, educated household heads are likely to be more productive than their uneducated counterparts hence reducing their likelihood of being poor. Therefore, the level of education has a high significant effect on the rural poverty levels.

The findings of this study indicate that a male headed household is less likely to be poor than a female headed household. The results show that a female headed household is 7.8% more likely to be poor than a male headed household. However, Hichaambwa et al. (2015) found that female headed households are more willing to participate in horticultural farming than male headed households and therefore, have a higher probability of escaping poverty. This study hypothesized a mixed effect of the gender of the household head on poverty. This is because on one hand, male heads are perceived to possess more skills when it comes to income making opportunities as compared to their female counterparts. On the other hand, female heads are more willing to engage in horticultural farming than their male counterparts and hence are less likely to be poor. The results thereby show that the gender of the household head significantly affects the welfare of the household.

Age of the household head is found to be positively related to poverty. The older the household head the higher the probability of that household to be poor. The results indicate that a household is 2% more likely to be poor if the head is older. Hichaambwa et al. (2015) found that younger heads are more willing to participate in horticultural production than older household heads. This study hypothesized that the younger the household head the less likely that such a household will be poor. This is because younger heads are more willing to take risks and compete for income generating opportunities and thereby reducing their likelihood to be poor. However, the results of this study show that age of the household does not significantly affect rural poverty levels.

Accessibility to credit reduces the likelihood of a household being poor. The findings indicate that a household is 3.9% more likely to be poor if it lacks access to credit. According to the neoclassical theory, unequal endowments of talent, skills and capital are major causes of poverty. A household that is able to access credit is less likely to be poor. This is because credit facilities enable the small scale rural horticultural farmers to access capital required to acquire assets and key inputs of production that will increase their output, thereby increasing their income and reducing their chances of being poor. As shown by the results, accessibility to credit has a high significant effect on rural poverty levels.

The findings indicate that a married household head is more likely to be poor than an unmarried head. The results show that a married household head is 6.6% more likely to be poor than an unmarried head. This is because a married head has a spouse and maybe children who rely on the income earned and hence increase the probability of the household being poor. However, the results of this study indicate that marital status does not significantly affect the welfare of the household.

Location in a fertile area reduces the likelihood of a household being poor. The findings show that a household is 4.3% less likely to be poor if it is located in a fertile area. This is because fertile areas with good climate and good soils will enable their crops to do well and produce high yields which will increase their incomes and reduce their chances of being poor. Therefore, as indicated by the results, the location significantly affects the poverty levels.

The size of the household is found to have a positive relationship with poverty. The larger the size of the household the more likely that such a household will be poor. The results show that a larger household is 2% more likely to be poor than a smaller household. However, a household with a higher number of dependants can also be less poor than one with fewer dependants. This mixed effect is because the dependants will either consume greater income of a household and hence become poorer or they can be a source of labour and thereby earn more income for the household, reducing the likelihood of being poor. The results indicate that the size of the household significantly affects the poverty level of a household.

In conclusion, only the age of the household head and the marital status are found not to significantly affect the poverty level of a household.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.0 Introduction

This chapter presents the summary, conclusions and policy implications of this study. Section 5.1 gives the summary of the study while section 5.2 gives the conclusion and policy implications of this research.

5.1 Summary of findings

The main objective of this study is to analyze the impact of small scale horticultural farming on rural poverty in Kenya. In order to achieve this objective, the study came up with three specific objectives; first, to analyze the impact of the horticultural sector in general on rural poverty; second, to establish the determinants of poverty amongst small scale horticultural farmers and finally to make policy implications based on the findings of this study.

To address these objectives, various existing literature were reviewed. The study reviewed the economic theories on poverty such as the classical theory, neoclassical theory, Keynesian theory, Marxian theory and contemporary theories. Empirical literature was also reviewed which enabled the study to identify and come up with the variables that will be used to achieve the set objectives. The identified variables from the literature review include market channels used, individual characteristics such as gender, age, level of education, enforcement of high quality standards, access to credit, engagement in horticultural farming, possession of post-harvest facilities and skills, type of crops grown, member of a co-operative or not, marital status, location and number of children.

The study uses logistic regression on data mainly sourced from the KIHBS (2005/6) to estimate the impact of horticultural farming on rural poverty and also to estimate the determinants of poverty among small scale horticultural farmers. Using the maximum likelihood method of estimation, the study finds that majority of rural households are non-horticultural farmers and therefore most of them are found to be poor. Therefore, engagement in horticultural farming is found to be a strong determinant in poverty reduction. Other factors that were found to significantly affect

the impact of small scale horticultural farming on rural poverty include the commercialization of horticultural produce especially in the export market, a high level of education of the household head, accessibility to credit, possession of post-harvest facilities and skills, flower farming over fruits and vegetable farming and finally being a member of a cooperative society.

5.2 Conclusion

The increased demand for horticultural produce both locally and globally is expected to alleviate poverty especially rural poverty in Kenya through increased incomes and generation of employment. This is because majority of horticultural crop growers are small scale farmers who are found in rural Kenya. However, from the reviewed household data, poverty remains widespread especially in rural areas as compared to urban areas. This study therefore, investigates the impact of horticultural farming on rural poverty and also the determinants of poverty amongst small scale horticultural farmers using the 2005/2006 Kenya Integrated Household Budget Survey. Two equations are estimated to this regard, both being derived from a logit model.

The results of the equation estimating the impact of horticultural farming on rural poverty indicate that households that engage in horticultural farming are less likely to be poor than those that do not engage in horticultural farming. Furthermore, the results show that the market channel used, enforcement of quality standards, membership in a cooperative society and possession of post-harvest facilities and skills are some of the factors that significantly influence the impact of horticultural farming on rural poverty in Kenya. Use of a market channel especially the export market channel positively influences the impact of horticultural farming on rural poverty as compared to subsistence farming. Possession of post-harvest facilities and skills together with being a member of a cooperative society also influence the impact of horticultural farming on rural poverty in a positive way. It is only enforcement of quality standards which is found to influence the impact of horticultural farming on rural poverty in a negative way. This is because the small scale farmers face more challenges and difficulties in complying with the quality standards in terms of capital, labour and information.

On the other hand, the results of the equation estimating the determinants of poverty amongst small scale horticultural farmers indicate that the education of the household head, gender of household head, age of household head, accessibility to credit facilities, marital status of household head, size of the household and location are some of the significant factors determining poverty amongst small scale horticultural farmers. The results show the determinants that reduce the probability of poverty amongst small scale horticultural farmers are a male household head who has a high level of education and is of a young age. Furthermore, accessibility to credit, location in a fertile area, a small household size and an unmarried household head are determinants that also reduce poverty levels amongst small scale horticultural farmers.

5.3 Policy Implications

Poverty still remains a huge challenge in Kenya especially rural poverty. This study indicates that horticultural farming provides a good opportunity to alleviate poverty amongst small scale farmers who are found in rural areas. There is need to increase the impact of horticultural farming on rural poverty through implementation of appropriate policies and frameworks. If majority of the rural farmers were horticultural farmers, the impact on rural poverty would be significant in that there would be considerable reduction in rural poverty. There is therefore a need to encourage, through various policies, engagement in horticultural farming by rural households. For instance to encourage more farmers to engage in horticultural farming, there is a need to come up with policies that will enable channeling of more public resources towards horticultural farming.

The market channel used was also found to have an important impact on the welfare of a household. Therefore, policies that will invest in improving the distribution mechanism of horticultural produce will have a large impact on reducing poverty amongst rural households. Such policies will enhance trade and enable easy access to the market through infrastructure development which will go a long way in enhancing the impact of small scale horticultural farming on rural poverty. Furthermore, market development policies such as diversification of the channels to include participation in supermarket channels for instance and to enable easy access to the export market will contribute to income growth amongst the small scale farmers.

The results of this study have indicated that high quality standards, lack of post-harvest facilities and skills, lack of education, lack of access to credit and location contribute to rural poverty. These factors tend to reduce the potential of horticultural farming in alleviating poverty. Therefore, there is a need to invest in policies that will increase education opportunities, enable accessibility to credit, irrigation schemes for areas with adverse climate, setting up of frameworks that provide institutional support in terms of capital facilities and skills. Policies focusing on these factors will enhance the impact of small scale horticultural farming on rural poverty.

There is also need to invest in policy prescriptions that focus on provision of capital goods such as education so as to increase human capital, infrastructure to increase productive capacity and market development. Policies that also target institutional frameworks such as setting up of cooperative societies which will enable the small scale horticultural farmers to access credit and acquire post-harvest facilities and skills.

From the theoretical literature it is evident that there is no single cause of poverty but an intertwining of different complex aspects of the dynamics surrounding it. This study reveals that there are three main factors that influence the impact of small scale horticultural farming on rural poverty in Kenya; individual characteristics, the market system and underdevelopment. This therefore implies the integration of various policies that focus on provision of different forms of capital, anti-discriminatory laws, community development and policies to offset market failures. Implementation of such policies will enhance the impact of small scale horticultural farming on rural poverty and thereby alleviating poverty in Kenya.

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