DETERMINANTS OF POVERTY IN KENYA

BY

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DECLARATION

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

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This research paper has been presented for examination with our approval as University supervisors

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Date.....

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DEDICATION

To my beloved family: My beloved wife Dorcas Otieno, Dad Michael Owidhi and Mum Hellen Akeyo Owidhi. My sister Joan and brothers Martin, Mathew, Nicholas, Thomas, Wycliff and Kevin.

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Meanwhile, I take responsibility for any errors and/or omissions in this paper. The views and expressions in this paper are solely mine.

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ABBREVIATIONS AND ACRONYMS

COMESA	Common Market for Eastern and Southern Africa				
EAC	East Africa Community				
FAO	Food and Agricultural Organization				
GDP	Gross Domestic Product				
GOK	Government of Kenya				
KFSG	Kenya Food Security Steering Group				
KIHBS	Kenya integrated Household Budget Survey				
MDGs	Millennium Development Goals				
OSSREA	The Organization for Social Science Research in Eastern and Southern Africa				
SDGs	Sustainable Development Goals				
UNICEF	The United Nations Children's Fund				
WEF	Women Enterprise Fund				
WHO	World Health Organization				

YEF Youth Enterprise Fund

ABSTRACT

Introduction: Poverty continues to be one of the major concerns of economies of the day. Developing countries in particular have found it very key in their development agenda as it affects economic growth and development. The conclusion of the Millennium Development Goals has seen a shift from eradication of extreme poverty and hunger (MDG1) to the Sustainable Development Goal of ending poverty in all its forms everywhere (SDG1) by 2030. In Kenya, poverty continues to be a challenge with an average of 45.9 per cent poverty rate reported in 2005.

Objectives: This study was set to identify the determinants of poverty in Kenya. As a contribution to existing research work on determinants of poverty, the study seeks to find out whether county of residence contributes to poverty. Lastly, the study was to identify policy implications to reduce poverty in Kenya.

Methodology: Logit model is used to derive the determinants of poverty using Stata software. The study used poverty based on consumption per capita as the dependent binary variable with several independent variables that include household characteristics taking into consideration that household is the unit of analysis. The study used the Kenya Integrated Household Budget Survey (KIHBS) data collected in 2005/06 by the Kenya National Bureau of Statistics (KNBS).

Findings: The study shows that poverty is determined by the household size, occupation, gender, marital status and level of education of household members. The study also shows that poverty is determined by the area of residence of a household (rural or urban) and the time taken to collect water as well as to travel to the place of work. Most importantly, the study show that county of residence determines poverty, with some counties being poorer than others.

Policy Implications: The study proposes valuable policy implications necessary to sustainably reduce poverty. These include: improvement of the rural areas through infrastructure development and industrialization; modernization of the agricultural sector to add value to primary produce; adoption, promotion and improvement of the quality of education infrastructure policies; and the initiation, promotion and improvement of county specific poverty reduction policies by different counties depending on the factors that drive their populace into poverty. Moreover, sanitation policies should be updated to deal with wastes disposal and management including the upgrading of slums that are a bedrock of poverty in the urban centers.

We recommend that both the National and the County Governments in Kenya collaborate and uptake these poverty reduction policy implications and incline them into their development agenda towards sustainable eradication of poverty in all its form in order to attain a "Globally competitive and prosperous Kenya by 2030"

Conclusion: The study concludes that county of residence is a major determinant of poverty alongside other household characteristics. These include household size; level of education of household members; occupation of household members; time taken to collect resources such as water and the transport infrastructure.

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CHAPTER ONE: BACKGROUND INFORMATION

1.1 Introduction

The success of the Government can be viewed in one way as its ability to shield its citizens from poverty. In this regard Kenya's move towards a poverty-free economy is worth looking into. In fact a poverty-free Kenya would be healthy and most likely to undertake its economic activities fully. This will as well enhance economic growth and development towards the achievement of the Kenya Vision 2030. In fact, the fight against poverty is among the top most agenda for the Kenyan government today.

The basic report on well-being in Kenya indicated that Poverty remained high in Kenya and continues to rise especially in the urban areas (Republic of Kenya, 2007). The report showed that overall poverty rose from 44.8 per cent in 1992 to about 45.9 per cent in 2005. The report further indicated that the overall poverty rates in Kenya were 40.3 per cent and 52.3 per cent in 1994 and 1997 respectively. Table 1 shows the National poverty rates.

Year	National Poverty Rate(per cent)
1992	44.8
1994	40.3
1997	52.3
2005	45.9
2012	47.8

Table	1:	National	Povertv	rates	in	Kenva.
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Source: Republic of Kenya 2007 and Kenya Food Security Steering Group 2012.

Table 1 indicates the pervasive nature of poverty in Kenya. In 1992, the poverty rate was 44.8 per cent which reduced to 40.3 per cent in 1994 before rising to 52.3 per cent in 1997. The poverty rate then fell to 45.9 per cent in 2005 and rose again to 47.8 per cent in 2012 (Kenya Food Security Steering Group (KFSG), 2012). Similarly, in 2012, the Kenya Food Security Steering Group, articulated that there was wide spread poverty across Kenya in 2005. The data is presented in figure 1.



Figure 1: Poverty levels by District in Kenya in 2005.

Source: Author's construction based on data from Kenya Food Security Steering Group, 2012

From figure 1, Kilifi district was the poorest with 70 per cent of its population being poor while Kiambu district was the least poor with only 23 per cent of its population being poor. Urban poverty was highest in Kilifi, Moyale and Homabay where about 71 per cent of the urban dwellers were poor. The least urban-poor district was Kiambu with a 22 per cent urban poverty rate. Based on rural poverty, Vihiga district was the most rural-poor (78 per cent) while Nandi

North and South were the least rural-poor (27 per cent). As reflected in table 1 and figure 1, poverty in Kenya is indeed pervasive. It is felt both nationally and at the district levels.

A look at the County poverty rates based on the 2005/06 KIHBS data reveals that Turkana County has the highest poverty rate at 92.9 per cent while Kajiado County is the lowest with 12.1 per cent. The data on County poverty rates is presented in figure 2 that follows. The figure indicates that more than 50 per cent of the Counties in Kenya have higher poverty rates above 46 per cent



Figure 2: County Poverty Rates based on the 2005/06 KIHBS data

Source: Kenya Open data 2015

The persistent nature of poverty is as well illustrated in figure 2 where about 26 counties are above the average poverty rate in Kenya. Figure 2 indicates that the magnitude of poverty varies from county to county. In most cases, the poor counties have poor infrastructure and poor access to public services. This shows that Kenya has not been able to adequately reduce poverty despite several attempts by the government since independence.

The Government of Kenya has so far applied several poverty reduction strategies such as rural development programs especially agricultural development and infrastructural improvements to enhance its access to the rural poor. Similarly, slum upgrading has been on the rise since slums are the hub of poverty in urban areas.

Kenya's commitment to poverty eradication is drawn from the Sessional paper No.1 of 1965 that points out the Government's dedication to alleviate poverty. Since then, several Sessional papers, plans and strategies and policy documents have been put in place to tackle poverty, the latest being the Sessional paper No.10 of 2012 on the Kenya Vision 2030. This paper advocated for a reduction in poverty from the current poverty level of about 46 per cent (in 2005) by between 3 and 9 per cent by 2030.

The Millennium Development Goals (MDGs) of 2000 advocated for eradication of extreme poverty and hunger by 2015 as its first goal (Republic of Kenya, 2008). This MDG targeted to halve, between 1990 and 2015, the proportion of the population living under extreme poverty (those with income less than a dollar a day). Ultimately, the goal was to use a multidimensional approach to attack the possible root causes of poverty. This goal led to the development of the Interim Poverty Reduction Paper, the Poverty Reduction Strategy Paper and the Economic Recovery for Wealth and Employment Creation as strategies to alleviate poverty (Organization for Social Science Research in Eastern and Southern Africa (OSSREA), 2006). Poverty level was expected to drop from 47.8 per cent in 2012 to about 42 per cent in 2015 (Republic of Kenya,

2012). On the global front, policies on poverty are geared towards sustainable poverty reduction strategies.

1.2 Poverty Related Policy Plans and Prospects in Kenya since Independence

The Government of Kenya has been formulating various development plans since independence to guide its economic development and growth. The First Development plan (the "Red plan") was drafted in 1964 and later modified in 1966 (the "Green plan"). The main focus of the plan was to guide the country in realizing its goals after achieving political independence. The second Development plan of 1969 was based on the Sessional paper No. 10 of 1965 on "African Socialism and its Application to Planning in Kenya." It was the policy of the Government "to reduce the income gap between the rich and the poor to a socially acceptable level within a reasonable period of time" (Republic of Kenya, 1969:3). This was actually a commitment to reduce poverty.

The third development plan recognized poverty as one of the post- independence enemies (Republic of Kenya, 1974:1). The population was growing at a high rate while the average standard of life remained low. In fact, there was greater need to bridge the gap between the rich and the poor (Republic of Kenya, 1974:2). This called for the fourth development plan that focused mainly on poverty alleviation (Republic of Kenya, 1979: iii). The plan reckoned that poverty reduced slightly between 1969 and 1976 (Republic of Kenya, 1979:5). The plan defined several dimensions of poverty which included: inadequate income; malnutrition and inadequate standard of living. It emphasized on research on poverty dimensions for the next several years (Republic of Kenya, 1979:11). This was to be implemented four-fold: Creation of income generating activities; improvement in expenditure patterns; pursuing other basic needs; and institutional building. Indeed, the most important way of overcoming poverty came out to be

productive participation in development (Republic of Kenya, 1979:11). Moreover, by creating more income generating opportunities and providing goods and services directly to the people, it was expected that poverty will soon be alleviated (Republic of Kenya, 1979:17). The plan recognized further that the only remedy to poverty is by supporting the poor to be more productive through income generating activities.

For future development purposes, the Government declared poverty a national phenomenon and strategized on how to combat it (Republic of Kenya, 1984:55). Increased food production and poverty alleviation were the major sectorial development plans with a special focus of being self-sufficient in basic food stuff (Republic of Kenya, 1984:177). Employment creation, production and exports were the major policies for poverty alleviation rather than Government involvement.

In 1997, the Government of Kenya articulated that quite a number of its population (about 52.3 per cent) still lived below the absolute poverty line since 1980 (Republic of Kenya, 1997:1). It stated as well that policies that hastened rural development and urban employment could help reduce poverty. Indeed, long term strategies were aimed at achieving high and sustainable economic growth (Republic of Kenya, 1997:151). Inequality, on the other hand, was identified to be a contributor to short run poverty and was to be eradicated through attainment of rapid market based growth and creation of income generating activities, fiscal redistribution and reduction of marginal tax rates (Republic of Kenya, 1997:152). It was further noted that the implementation of the Structural Adjustment Programs worsened poverty.

In 2001, the Government of Kenya introduced the Poverty Reduction Strategy Paper (PRSP) in which several policy strategies and measures were put forward to avert poverty and spur economic growth. In fact, poverty had become a national challenge (Republic of Kenya, 2001:1).

The paper noted that the main causes of poverty included: low agricultural productivity and poor marketing; poor governance; falling national income; income inequality; unemployment; low wages and incomes; HIV/AIDS; poor environment; insecurity and corruption (Republic of Kenya, 2001:28). Several macroeconomic policies were set up to reduce poverty. These included increased public investment; improved public expenditure in line with poverty; reduction of domestic debt to a sustainable level; appropriate tax policies; harmonization of tariffs with EAC/COMESA and institutional reforms for monetary policy.

The Government of Kenya also set up various targets and policy programs under the Economic Recovery Strategy for wealth creation (ERS) for the period 2003 to 2007. The Poverty Eradication Commission was set up in 2003 with the mandate of implementing the poverty alleviation policies of the Government. The agricultural sector was recognized as critical in economic growth and poverty reduction (Republic of Kenya, 2003:4). Several funds were also put in place geared towards poverty eradication including The Women Development Fund (WDF), Youth Enterprises Fund (YEF) among other devolved funds such as the revolving loan fund. These funds were however managed poorly and did not meet the targets they were set for (Republic of Kenya, 2003:7). The Poverty Eradication Commission did not however meet the targets due to inadequate funds, shortage of technical staff and lack of proper coordination among the poverty initiatives at the grass root levels (Republic of Kenya, 2003:145).

The Government of Kenya (GOK) then launched the Kenya Vision 2030 in 2008 as the Country's new long term development plan aimed at transforming Kenya into a "Globally competitive and prosperous country with a high quality of life by 2030 (Republic of Kenya, 2008: 3)." The Kenya Vision 2030 is anchored on three pillars namely: the economic pillar, the social pillar and the political pillar. These pillars are to be supported on the foundations of

macroeconomic stability; continuity in government reforms; enhanced equity and wealth creating opportunities for the poor. The Vision 2030 was sub-divided into manageable medium term plans. In the First Medium Term Plan of the Vision 2030, several policy plans were in place to map out the spread of the poor in the country and meet their needs (Republic of Kenya, 2008:4). The Government was to carry out a comprehensive study and analysis of poverty aimed at revising its poverty reduction initiatives as set out in the National Poverty Reduction Strategy. In the Second Medium Term Plan of the Kenya Vision 2030, poverty was considered a threat to human life in spite of the policy initiatives used (Republic of Kenya, 2013).

Based on the various policy plans and papers so far analyzed, it is notable that the Government of Kenya is out to sustainably reduce poverty despite its pervasive nature. However, it is still questionable why the Government's policy initiatives have not been able to reduce poverty by a big margin.

1.3 Problem Statement

Global, regional and national policies continue to focus on sustainable poverty reduction. However, there seem to be no end for such a "battle". In particular, the Republic of Kenya has been pursuing several policies to avert poverty. By 2015, the termination of the Millennium Development Goals (MDGs) led to the adoption of post MDGs to see through the realization of the goals that were not yet realized by 2015. This is a clear indicator that policy mechanisms are yet to meet the targets of the MDGs on Poverty. Moreover, the Sustainable Development Goals (SDGs) have so far been launched globally, with the aim of eradicating extreme poverty in all its forms. Most of the development plans and strategy papers have defined policies aimed at reducing poverty. To this end, poverty remains "an enemy" of the people of Kenya, East Africa, Africa and the World at large. Most probably, the reason could be failure to amicably address the determinants of poverty fully and comprehensively. It is as well possible that overtime, new determinants of poverty such as county of residence have come to play making some policies irrelevant and outdated. Moreover, most of the studies that have been conducted in Kenya on the determinants of poverty have used the 1994 household survey. Some of these studies include Mwabu, Masai, Gesami, Kirimi, Ndeng'e, Kiriti, Munene, Chemngich, & Mariara (2000), Oyugi (2000), and Mwabu, Alemayehu, Nick, & Mwangi (2001). These studies focused either on the national, district or household level analysis. Despite these studies and their recommendations, poverty remains a challenge, indicating that there is still more that needs to be done!

It is this concern that drives this paper. In particular, the paper seeks to find out the determinants of poverty in Kenya and whether County of residence determines poverty (the main contribution) with a view of getting a remedy and cushioning the economy from poverty. With the devolved system of Government in Kenya, identification of policy driven poverty reduction strategies would be of great importance not only to the County Governments but also to the National Government for policy actions.

1.4 Research Questions

The study seeks to answer the following research questions:

- 1. What are the determinants of poverty in Kenya?
- 2. Does County of residence determine poverty in Kenya?

3. What possible policy implications can be made with regards to poverty alleviation in Kenya?

1.5 Objectives of the Study

The general objective of the study is to find out the determinants of poverty in Kenya.

The specific objectives are:

- 1. To find out the determinants of poverty Kenya.
- 2. To find out whether County of residence determines poverty in Kenya.
- 3. To suggest policy implications aimed at alleviating poverty in Kenya.

1.6 Justification of the Study

The study is necessary since poverty alleviation is among several Governments' concerns today. In fact, poverty reduction ought to be a basic requirement for any economy that aspires to attain economic growth and development. To this effect, Sustainable Development Goals have been launched so as to move the global development agenda forward. Moreover, given that Kenya has devolved Government system, through realization that County of residence also determines poverty, Counties will be able to formulate County-specific productive and issue-based policies for poverty eradication.

Indeed, there is need to tackle poverty through policies that focus specifically on its main determinants. This paper is motivated by the need to identify these determinants so that the Government of Kenya (both the Counties and National) can be specific when designing poverty reduction strategies and policies. Further motivation is drawn from other research works on poverty such as Mwabu et al. (2000), Oyugi (2000), Mwabu et al. (2001), and Kariuki (2006) that have worked on determinants of poverty based on the Welfare survey of 1994. This paper uses the 2005/6 Kenya Integrated Household Budget Survey data to undertake the task.

1.7 Organization of the Paper

The paper is organized as follows: chapter one has given the background information on poverty in Kenya while chapter two reviews the existing literature. In chapter three, methods of the study are outlined while chapter four gives the estimation results. Finally, the policy implications and the conclusion will be presented in chapter five.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter gives basic concepts and definitions of poverty and a summary of the theoretical and empirical literature.

2.2 Definition of Poverty

Poverty can be defined in different ways. Sen (1981) gives three definitions. That is, Poverty is: (1) A situation of insufficient essential facilities due to inadequate income; (2) Failure to meet the basic human needs; and (3) Lack of opportunities. Sen (1981) indicates that the modern definition of poverty is based on the availability of opportunities and that poverty occurs when one is deprived of opportunities and has no security.

2.3 Measurement of Poverty

Poverty can either be relative or absolute. Relative poverty compares the incomes of the poor and that of the general public (Seymour, 2009). According to Seymour (2009), relative poverty is generally set at 60 per cent median. Those with incomes lower than the 60 per cent median are said to be relatively poor and vice versa. On the other hand, Seymour (2009) points out that absolute poverty is the poverty level that does not change over time in terms of the living standards it represents. Moreover, the absolute poverty represents a certain level of basic goods and services and only rises subject to inflation.

Some of the most common approaches to poverty measurement include the Cost of basic needs approach and the Food Energy Intake method. A brief summary of these approaches is as follows:

2.3.1 The Cost of Basic Needs Approach

Haughton and Khandker (2009) pointed out that to measure poverty using the Cost of basic needs approach, one should first pick a nutritional requirement for good health such as 2250 calories per person per day as proposed by the Food and Agricultural Organization, then estimate the cost of meeting this food energy requirement using representative diet of the habits of the people near the poverty line. Haughton and Khandker (2009) call this food component (Z^F). They suggest that we then add a non-food component (Z^{NF}). The basic needs poverty line is given by

$$Z^{BN} = Z^F + Z^{NF}.$$

In this case, Z^{BN} is the cost of basic needs poverty line. A household that falls below the poverty line is considered poor, otherwise they are not.

2.3.2 The Food Energy Intake Method

Using the Food Energy Intake Method to measure poverty, Haughton and Khandker (2009) aimed at finding the level of consumption expenditure necessary to obtain enough food to meet the energy requirements for a given household. They illustrated this using a Calorie- Income function: as income rises, food energy intake also rises though typically as shown in figure 3

Figure 3: Calorie- Income Function



Source (Haughton and Khandker, 2009)

Based on the Calorie income function in figure 3 adopted from Haughton and Khandker (2009), as income increases, a household is able to buy more food to satisfy its energy requirements.

Thus given some level of adequate food intake K, one may obtain this curve in order to determine the poverty line, that is, the level of expenditure, Z. According to Haughton and Khandker (2009), the function shows that K = f(y). Thus given monotonicity, $y = f^{-1}(K)$ or given a minimum calorie level, $K_{min.}$, we can get $Z = f^{-1}(K_{min.})$, where Z is the poverty line and any household falling below the poverty line is deemed poor.

2.4 Theoretical Literature

Different theories exist that explain the different types of poverty. This study analyses these theories in order to deeply understand the basis of poverty, its nature and distribution. These theories give the root causes of different dimensions of poverty. They are outlined as follows:

2.4.1 Poverty caused by Individual Deficiencies

Ted (2007) noted that individuals are responsible for their poverty status and that this theory is based on individuals' own deficiencies. Ted (2007) added that the Neo-classical economists supported this theory of poverty given that with the assumption of perfect information, individuals seek to maximize their own wellbeing by making choices and investments. As Gwartney and Caleb (1985) have argued, "the poor are a "moral hazard" and the problem of poverty continues to fester us not because we are failing to do enough , but because we are doing too much that is counterproductive" (as cited in Ted, 2007). Ted (2007) notes further that any individual can succeed provided he/she works hard, is motivated, persistent and has skills.

2.4.2 Poverty caused by Cultural Belief Systems that support sub-cultures of poverty.

Ted (2007) observes that the root cause of this theory is the "culture of poverty". He indicated that poverty is created by the transmission over generations of a set of beliefs, values, and skills that are socially generated but individually held. Therefore, individuals are victims of their poor dysfunctional subcultures or culture.

2.4.3 Poverty caused by Economic, Political, and Social Distortions or Discriminations

Ted (2007) has pointed out that poverty is caused by socioeconomic and political systems that subject the people into limited opportunities and resources with which to achieve income and wellbeing. He adds that the economic systems are in most cases designed and structured in a way that will always see the poor people fall behind irrespective of how competent they may be. Ted (2007) indicated that Tobin (1994) pointed out that the problem of the working poor is the wage problem hinged on the structural barriers that prevent the poor from getting better paying jobs and lack of growth in sectors supporting lower skilled jobs. Further to this, Blank (1997) and Quigley (2003) have documented that wages and fringe benefits for the low income people have continuously declined although the availability of jobs tend to remain the same. This indicates that the system has created increasingly difficult situations for those who want to work. Ted (2007) also reckons that the political system does not look into the interests of the poor. In fact, several groups of people undergo social stigma as a result of race, gender, disability and religion among others. The stigmatization exposes them to poverty.

2.4.4 Poverty caused by Geographical Disparities

Morril and Wohlenberg (1971) have argued that "disinvestment, proximity to natural resources, density and diffusion of innovation" are among the factors that best explain geographical poverty (as cited in Elgie and Ulch, 1973). This theory argues that in some regions, there is a lot of cumulated wealth barely based on resource availability while in other regions, poverty is paramount. In this regard, poverty patterns are arguably dependent on environmental, social and economic variables that are geographically determined" (Elgie and Ulch, 1973).

This theory implies that differences in objective resources are required for the wellbeing of the people. In this case, those regions, institutions or cultures that lack these resources deny the people the opportunity to generate wellbeing and income and also lack the power to claim redistribution of the resources

2.4.5 Poverty caused by Cumulative and Cyclical Interdependencies.

This theory is based on Myrdal,'s theory of cumulative causation" as revisited by Fugita (2004). This theory argues that economic nature of any given magnitude depends on the interrelationships that exist in the economy between and among various economic agents within the community or any economic set up. In fact, Fugita (2004) argues that Myrdal linked personal and community wellbeing in a wave of negative consequences that are intertwined. Thus the interdependence of factors creating poverty accelerates once a cycle of decline has been started.

Observably, this theory looks at the individual and the community as intertwined in a wave of opportunities and challenges and that once problems accumulate; they close other opportunities and create a cumulative set of problems making an effective response almost impossible. The theory thus looks at the individual situation and the community resources as mutually dependent.

In this regard, a faulty economy automatically makes survival harder. It provides unfavorable opportunities to its agents further exposing them to unsupportive social contexts which then affect their psychological abilities at the individual level. Therefore, once a cycle of economic decline has started, it accelerates because of the underlying interdependencies that are neither supportive nor favorable.

2.5 Economic Measures of Poverty

The study looks at various ways in which several economists have measured poverty. These are outlined as follows.

2.5.1 The FGT Measure

This measure of poverty was developed by Foster, Greer and Thorbecke (Foster, Greer and Thorbecke, 1984). The FGT is a common class of poverty measures from which other measures

are drawn. The measure,
$$P(\alpha)$$
, is given as $P(\alpha) = \frac{1}{N} \sum_{i=1}^{N} \left(\frac{z - y_i}{z}\right)^{\alpha} I(y_i \prec z)$, where N is the

population size for which the measure is computed, y_i is the level of individual welfare (measured by the real per capita consumption) of the *i*th individual, z is the poverty line, I (.) is an indicator function that takes a value of 1 when the constraint is satisfied and 0 otherwise, and α is the poverty sensitivity indicator.

Based on the FGT measure, three other economic measures of poverty can be obtained. These include the poverty headcount index, the poverty gap index and the poverty severity index.

2.5.2 Headcount Index (*P*_a)

This is the simplest and most commonly used poverty index. It measures the proportion of the population considered to be poor (denoted by P_0). The headcount index is usually given by the general form $P_0 = \frac{N_p}{N}$, where N_p is the number of poor people and *N* is the total population or the sample population.

Based on the FGT, the headcount index is computed by setting $\alpha=0$ in the FGT measure. This gives $P(0) = \frac{1}{N} \sum_{i=1}^{N} I(y_i \prec z)$.

The poverty headcount measures the incidence of poverty. That is, the proportion of the population that cannot be able to purchase the basic basket of goods and services at the poverty line.

2.5.3 Poverty Gap Index (P_1)

This index is computed by setting α =1 in the FGT measure. This gives:

$$P(1) = \frac{1}{N} \sum_{i=1}^{N} \left(\frac{z - y_i}{z} \right) I(y_i \prec z)$$

This index shows the depth of poverty. In particular, the poverty gap index shows how much poorer the poor persons are relative to the poverty line. It captures the average expenditure shortfall or gap for the poor in relation to the poverty line. It can be obtained by summing up all the expenditure shortfalls of the poor in relation to the poverty line then dividing by the total population. The poverty gap measures the poverty deficit of the population. That is, the amount of resources required to lift all the poor out of poverty mainly using perfectly targeted cash transfers with the aim of closing the gap. In other words, the poverty gap shows the resources required to eradicate poverty. However it does not measure inequality among the poor. Moreover, it is not practical to reach the whole population through cash transfers.

2.5.4 Squared Poverty Gap Index or Poverty Severity (P₂)

This is computed by setting α =2 in the FGT measure. Thus we obtain:

$$P(2) = \frac{1}{N} \sum_{i=1}^{N} \left(\frac{z - y_i}{z} \right)^2 I(y_i \prec z)$$

The poverty severity index takes care of inequality among the poor. That is, it shows how poor the poor are. It is important in assessing the impact of policies and programs aimed at reaching the poorest among the poor.

2.5.5 Sen Index

Sen (1976) proposed a poverty index combining the effects of the number of poor people, the severity of the poor people's poverty and how poverty is distributed within the group. The Sen Index is given by:

$$P_{S} = P_{0} \left[1 - \left(1 - G^{p} \right) \frac{\mu^{p}}{z} \right]$$

Where P_0 is the headcount index, μ^p is the mean income or expenditure of the poor, and G^p is the Gini coefficient of inequality among the poor. The Gini coefficient ranges from perfect equality (0) to perfect inequality (1).

2.5.6 The Sen-Shorrocks – Thon (SST) Index

Sen Index, follows. As а modification of the the SST can be defined as $P_{SST} = P_0 P_1^{p} (1 + G^{p})$. It is given by the product of the headcount index, the poverty gap index that is only applied to the poor, and a term with the Gini coefficient of the poverty gap ratios (of the G_n 's) for the whole population or sample. Given that the Gini coefficient here is close to 1, it shows pronounced inequality in the incidence of poverty gaps.

2.5.7 The Watts Index

This index was proposed by Watts in 1968. It is given by: $W = \frac{1}{N} \sum_{i=1}^{q} \left[\ln(z) - \ln(y_i) \right] = \frac{1}{N} \sum_{i=1}^{q} \left[\frac{z}{y_i} \right]$

.In this measure, the N individuals in the population are indexed in ascending order of income or expenditure while the sum is taken over the q individuals whose income or expenditure (y_i) falls below the poverty line z.

2.6 Empirical literature

Several researchers have done empirical work on poverty. This study focuses on the studies on the determinants of poverty. A review of some of the research work is as follows: Rukuni and Eicher (1987) carried out a research on "The Food Security Equation in Southern Africa". They found out that current research concentrated on the supply side of the food equation and how to improve the supply of food either through domestic production or through storage and trade. They cited that the demand side of food had been neglected by most researches. They advocated for comprehensive policies that address the supply and demand side of food in the long run. However, they were of the view that short run mechanisms and policies be put in place to address poverty so that individuals can purchase better diets.

While estimating the effect of different economic and demographic variables on the probability of a household being poor in Coasta Rica, Rodriguez and Smith (1994) used a logistic regression model. They used data from the National Household Income of 1986 and their results showed that poverty was higher for households whose heads had lower levels of education.

Reardon and Vosti (1996) presented the links between poverty and environment in rural areas of developing countries. They examined poverty in relation to the categories of assets the rural poor owned and also based on the environmental problems they faced. They then suggested putting up policies that focus on conditioning variables that affect market development, community wealth, infrastructure, household affordability and appropriateness of natural resource conservation strategies.

Kosura, Ariga, Okeyo, Waithaka and Kyalo (1999) set out to find the contribution of agriculture to economic growth. They identified policies aimed at rural development as critical in enhancing welfare such as expansion of cultivated area; use of higher value commodities and agricultural intensification. They articulated that market response to such policy initiatives would be critical in realizing their goals. Moreover, poverty was identified as a major challenge facing Kenya today: About 30 per cent urban dwellers and 50 per cent rural dwellers were found poor. This signaled a warning since about 80 per cent of the population is rural dwellers.

Oyugi (2000) carried out a study on the determinants of poverty in Kenya. She used both discrete and continuous poverty indicators as dependent variables and several household characteristics as explanatory variables (holding area, livestock unit, proportion of household able to read and write, household size, sector of the economy (agriculture, manufacturing/industrial or wholesale /retail trade), source of water for the household use and off-farm employment. Using a probit model and carrying out a macro (national) and meso (district) analysis, Oyugi (2000) found out that almost all the variables used are important determinants of poverty. The study used the 1994 Welfare Monitoring Survey data.

The other comprehensive study on the determinants of poverty was carried out by Mwabu et al. (2000). This study used household expenditure per adult equivalent to approximate a household welfare function. Mwabu et al. (2000) used overall expenditures and food expenditures as dependent variables to estimate three equations with varied dependent variables (total household expenditure gap (actual expenditure minus absolute poverty line) and the square of the gap. Mwabu et al. (2000) used discrete and continuous choice based regressions because they are simple and give similar results when compared to logit/probit models. The study arrived at unobserved regional-specific factors; mean age; size of the household; place of residence; level of schooling; livestock holding and sanitary conditions as the main determinants of poverty. Mwabu et al. (2000) pointed out that these determinants were important irrespective of the dependent variable used (total expenditure, expenditure gap or square of the gap). It should be noted however that according to Mwabu et al. (2001), the study by Mwabu et al. (2000) was based on weak assumption that increasing consumption expenditure

is critical in reducing poverty. Mwabu et al. (2001) also noted that the model used by Mwabu et al. (2000) was not able to give a probabilistic poverty statement directly.

In studying the determinants of poverty, Mwabu et al. (2001) were interested in explaining why some population groups were non-poor, others poor while others remained extremely poor. The study used per capita income and consumption to estimate poverty. They used a two stage analysis in which stage one involved identifying the poor and the non-poor while stage two involved examining the likelihood of being extremely poor, having been identified as poor. By assuming a logistic cumulative distribution, they used a logit model which could identify the poor and the non-poor. They then used a polychotomous (an ordered logit or probit model) on the hard-core poor versus the poor and the non-poor. Mwabu et al. (2001) ordered the population sub-samples using total and food poverty lines as cut-off points in a cumulative distribution of expenditure. They used an ordered logit because the categories have a natural ordering. The study used several explanatory variables grouped in categories such as property-related (land and livestock holding); household characteristics (status of employment, age, level of education and household size); and others (for example time spent to fetch water and obtain energy, place of residence of household (rural, urban or province). Mwabu et al. (2001) inflated the number of households in the sample (about 10000) to the total population of about 26 million in 1994 using expansion factors. Their probabilistic findings indicated that male-headed households are less likely to be poor as compared to female-headed households. Urban dwellers were found to be less likely to be poor than the rural dwellers while those involved in agricultural activities were found to be more likely to be poor compared to their counterparts in manufacturing activities. The study found out that the level of education was the most important determinant of poverty and that others include household size, employment sector and the number of animals owned.

Njeru and Murimi (2003) analyzed poverty and human security in Kenya using thematic and historical approaches. Based on the linkages they found to exist between the two, they recognized the fact that however much policies have been in place to avert both poverty and food security, they both seem to remain unchanged since Kenya became independent in 1963. Moreover, they were of the view that most poverty analysis have been dimensional. This implies that the analysis showed dimensions of poverty in relation to deprivations of access to consumption and food security.

Kariuki (2006) used logit model on the Welfare Monitoring Survey of 1997 to find out the determinants of poverty in Kenya, focusing on Transmara District. In this case study, Kariuki (2006) found out that healthcare, roads, sanitary conditions, literacy level, household size and land are the main determinants of poverty.

Deaton (2005) set out to measure the extent to which growth reduces global poverty. He found out that most consumption measured from household surveys, which is used to measure poverty, grows less rapidly than that measured at national accounts. He pointed out that the reason for the discrepancy is the unlikelihood of the richer households to participate in the surveys. He concluded therefore that current statistical procedures understate the rate of global poverty reduction in the world.

In an attempt to analyze the trends in food security and poverty in India, given the strong link between the staple food grains intake and poverty and based on a nutritional norm, Patnaik (2008) found out that a falling share of food expenditure in total expenditure as well as a falling share of grain expenditure in food expenditure are necessary but not sufficient indices of consumers becoming better off especially for a population already at a low standard of living.

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Achia, Wangombe and Khadioli (2010) used a logistic regression on Demographic Health Survey (DHS) with the Social Economic Status (SES) (that is, poor and non- poor) as the dependent variables and a set of demographic variables as explanatory variables. These included age of the household head, size of the household, and education level of the household head, type of residence (rural or urban), ethnicity and religion. They found out that all these variables were associated with the social economic status of the household and therefore caused poverty.

Mariara, Mwabu and Ndeng'e (2011) analyzed the link between Inequality, Poverty and Economic growth. They further assessed the extent to which growth in Kenya has been pro-poor. They found out that economic growth was upward in Kenya between 1994 and 1996 but dropped in 1997. The economy recovered up to 2007. On the other hand, poverty increased between 1994 and 1997 by about 13 per cent but declined by about 5 per cent in 2005/6. Further to their analysis, they found out that the impact of growth on poverty reduction was not effective because of inequality.

Lone and Rather (2012) explored food problems in India, questioning the effectiveness of the Government's interventions. They found out that on average, 21 per cent of the Indians are food insecure, and that about 25 per cent are poor. On drawing a poverty-line based on all basic needs, they found out that two-thirds of the Indians are poor. In conclusion, they argued that however much income poverty has reduced, food security remains a challenge.

2.7 Summary of the Reviewed Literature

From the empirical studies so far reviewed, Mariara et al. (2011), Achia et al. (2010), Kariuki (2006), Deaton (2005), Mwabu et al. (2001), Oyugi (2000) and Mwabu et al. (2000) are among

the researchers that have focused on the determinants of poverty in Kenya. These studies notwithstanding, the global, regional and the national policies continue to focus on sustainable poverty alleviation. However, there seem to be no end for such a "battle".

Following the reviewed literature and the focus of the paper, it is arguable that understanding the determinants of poverty is critical in guiding policy formulation and implementation with a view of reducing poverty. Studies by Oyugi (2000), Mwabu et al. (2000), Mwabu et al. (2001), Kariuki (2006), Deaton (2005), Achia et al. (2010) and Mariara et al. (2011) have identified several factors causing poverty. These include: economic growth; household size; level of education; status of employment; age; sector of the economy one is involved in; area of residence; holding area; land size; sanitary conditions and time spent collecting water and other energy sources. It is noted as well that comprehensive policies are necessary to avert poverty.

The studies so far reviewed have used several models in modeling the determinants of poverty and measuring poverty in various ways. For example, Oyugi (2000) used a probit model on discrete and continuous indicators of poverty while using calorie consumption as a measure of poverty. Mwabu et al. (2000) used discrete and continuous-choice based regressions to model poverty with total expenditure, total expenditure gap and the square of the gap as dependent variables. Logit and ordered logit models were used by Mwabu et al. (2001) by considering several dependent variables in different categories.

The studies so far reviewed show that county of residence has not been used as an explanatory variable in finding out the determinants of poverty. This gap is to be filled by this study. Moreover, this study will be using consumption per capita as a measure of welfare, having learnt from Mwabu et al. (2001).

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter outlines the methods applied in measuring poverty as have been used in the study of the determinants of poverty, illustrates the conceptual framework and finally presents the empirical framework of the study. The methods applied here are geared towards enriching the policy framework and mechanisms with a view of sustainably reducing poverty.

3.2 Approaches to Measuring Poverty.

This study follows the consumption approach to the measurement of poverty. This approach is preferred to the income approach because it is reliable and smooth across the rich and the poor (Republic of Kenya, 2007). Moreover, household data on income is not easy to get. This study follows the Basic Welfare report on the wellbeing in Kenya, based on the Kenya Integrated Household Budget Survey 2005/2006. In this regard, the study considers the food consumption component and the non-food consumption component in deriving the overall poverty line following the Cost of Basic Needs approach.

3.2.1 Food Consumption Component

The food consumption aggregate comprises of: (a) food consumption from purchases, (b) from own production, (c) from own stock and (d) gifts from other sources. The 2005/6 KIHBS collected over 276,000 observations of over 140 different food items consumed by 13,158 household (Republic of Kenya, 2007: 23). The nominal food consumption aggregate for each

household was computed as: $y_h^f = \sum_{i \neq h(i)} \left[\left(\frac{y_h^{i03}}{q_h^{i03}} \right) q_h^{i04} + p_c^{-i} q_h^{i05} + p_c^{-i} q_h^{i05A} + p_c^{-i} q_h^{i06} \right],$ where h_i

represented the set of all food items, *i*, consumed by household *h* while the superscripts indicate the consumption data source, that is, purchases (i03), consumption from purchases (i04), own production (i05), own stock (i05A) and gifts (i06). The quantity of consumption from purchases (q_h^{i04}) for each item was valued using the inferred price by taking the ratio of the reported purchase values (y_h^{i03}) over the quantity of purchases (q_h^{i03}) (Republic of Kenya, 2007)

3.2.2 Non Food Consumption Component

The non-food items include: personal care, medical care, transport and communication (about 80 items); domestic services, personal goods and recreation (about 60 items); and about 80 clothing items (Republic of Kenya, 2007)

3.2.2.1 The Food Poverty Line

Republic of Kenya (2007) recognizes that FAO recommends 2250 kilocalories as the daily per adult equivalent calorie requirements for Kenyans. Following this recommendation, rural and urban food poverty lines were computed by costing two different bundles of basic food items that can attain 2250 kilocalories at minimum, depending on rural and urban food tastes. The Basic Welfare Report of 2007 indicates that the Rural Food Poverty Line was Kshs. 988 while the Urban Poverty Line was Kshs. 1474 per month (Republic of Kenya, 2007).

3.2.2.2 The Overall Poverty Line

The 2007 welfare report recognizes that basic non-food items are as well essential for life. Through an iterative process, the mean value of the total non-food items was computed for household expenditures whose food expenditures fall within a one percentage point interval around the food poverty line. The average of the total non-food expenditure component was then added to the food component to obtain the overall poverty line. The Rural Overall Poverty Line was then reported as Kshs. 1562 while the Urban Overall Poverty Line was Kshs. 2913 per month (Republic of Kenya, 2007).

This study adapts both the food and overall poverty lines as reported in the Welfare report of 2007 for the purposes of deriving the determinants of poverty in Kenya. We however use consumption per capita as a measure of welfare instead of consumption per adult equivalent since the results are similar (see Mwabu et al. 2001).

3.3 Conceptual Framework

Poverty (headcount ratio) seems to be determined by several factors as outlined in the framework. The framework shows the interactive process through which the several factors that cause poverty can be counteracted by effective national and county policies. In the process, the level of poverty reduces. The framework is illustrated as follows:



The framework shows that agricultural productivity (area available for both crop and livestock production), level of education and several household characteristics are some of the factors that cause poverty. It further shows that relevant National and County Government poverty determinant oriented policies have the capacity to reduce poverty levels. The level of poverty reduction depends on the degree of effectiveness of the policies being applied and the magnitude of the deterministic factors. It is important to note that the poverty reduction policies being put in place should be holistic and follow a multi sector approach so as to have an overhaul effect. This study dwells mostly on the household characteristics as were collected in the KIHBS 2005/6.

3.4 Empirical Framework: Model specification

This study assumes that individuals are free to make their decisions. Based on this assumption and following Oyugi (2000), Mwabu et al (2001); and Kariuki (2006), the study uses Logit models to derive the determinants of poverty. Logit models allow us to establish a relationship between a binary outcome and a group of predictor variables. These models are easy to interpret and have flatter tails than probit models.

The model is based on a cumulative logistic probability function specified as $y_i^* = \alpha + \beta x_i + \varepsilon$, where y_i^* is a latent variable that is not observable and assumed to be normally distributed. That is, for y_i^* , $\varepsilon \sim N(0, \delta^2)$ but y_i is not and x_i are the explanatory variables. The explanatory variables include household size; marital status of the household head; gender; employment status; age; level of education; sector of the economy one is engaged in; area of residence (rural or urban); land size (acreage of land owned by a household for both livestock and crop farming); sanitary conditions; roads (time taken to travel to work as a proxy of road network); water (time taken to reach the nearest water source as a proxy of accessibility to water); and county of residence.

The observed variable y_i is a dummy variable that takes a value of 1 or 0 and is defined by

 $y_i = (1 \text{ if } y_i^* > 0 \text{ and}$

 $y_i = (0 \text{ if } y_i^* \le 0$

The cumulative logistic probability function is given as follows

$$p_{i} = f(y_{i}^{*}) = f(\alpha + \beta x_{i})$$
$$= \frac{1}{1 + e^{-y_{i}^{*}}}$$
$$= \frac{1}{1 + e^{-(\alpha + \beta x_{i})}}$$

We estimate this function using Maximum likelihood via STATA software. To obtain the effect of X on Y in each case, we compute the marginal effects $\frac{\partial y}{\partial x}$.

It is worth noting that the consumption component is generated as follows: The total household consumption expenditure is divided by the size of the household. This gives the expenditure per capita. The expenditure per capita is then compared with the poverty line, depending on whether a household resides in the urban or rural area. For those households whose consumption per capita is less than the poverty line, they are considered poor and they take a value of 1. On the other hand, for households whose consumption per capita is more than the poverty line, they are considered non poor and therefore take a value of 0. Since poverty status is the dependent variable, it is therefore a binary dependent variable, taking a value of 1 for households that are poor and 0 for the non-poor households.

For the counties of residence, eight counties were chosen to represent the former provinces before the promulgation of the new constitution which gave rise to 47 counties in the Republic of Kenya. These included Nairobi, Mombasa, Kisumu, Nyeri, Nakuru, Embu, Garissa and Kakamega. However, in order not to get into a dummy variable trap, Kakamega county was dropped and therefore becomes the reference county.

3.5 Hypothesis Testing

Table 2 shows the expected signs of the variables used in the model

Table 2: Postulation

Variable	Expected sign	Explanation
Household head	Negative for male and positive for female	Most men own property and are less likely to be poor compared to their female counter parts who are discriminated against asset ownership (Mwabu et al. 2000)
Marital status of household head	Negative for married and positive for either single, divorced or separated	Couples living together pool resources and are less likely to be poor (Mwabu et al. 2000)
Household size	Positive	Poverty and household size are directly related (Mwabu et al. 2000)
Employment sector	Negative	Poverty and employment are inversely related (Mwabu, et al. 2004).
Age	Negative	An individual is expected to accumulate more resources as he/she ages (Mwabu et al. 2000).
Level of education	Negative	There is an inverse relationship between poverty and education (Mwabu et al. 2000)
Occupation	Negative for industrial and positive for agriculture	Households engaged in agricultural activities are more likely to be poor than those in industrial sector (Mwabu et al. 2004)
Sanitary conditions	Positive for bush and negative for either pit latrines, ventilated pit latrines or flush toilets	Poor households have the worst sanitary conditions (Mwabu et al. 2000)
Transport (Time taken to go to work)	Positive	Poor transport infrastructure lead to poverty as they deny the people access to resources, opportunities and services (Mwabu et al. 2000).
Water (Time taken to collect water)	Negative	Poor households take a lot of time looking for water (Kariuki, 2006)

In table 3, we define the variables to be used in the study.

Variables	Definition	Symbol	Mean	Std. Deviation
Dependent Variable Poverty	P=1 if poor, 0 otherwise. Poverty estimated based on consumption per capita	Pov in the binomial logit model	0.80	0.40
EXPLANATORY V	/ARIABLES			
Sex	Sex=1 if male, 0 otherwise	SEXD	0.93	0.26
Age and Age Square	Years	AGE1 and AGE2	25.49	12.99
Head of House hold	=1 if man and 0 otherwise	HHEAD	0.70	0.46
House hold Size	Units	HHSIZE	5.05	2.81
Marital status	=1 if married and monogamy, 0 otherwise	MARYMONO MARYPOLY	0.66 0.12	0.47 0.33
	=1 if married and polygamy, 0 otherwise			
Employment Sector	=1 if formal/public and 0 otherwise	EMPSECD	0.16	0.37
MainOccupation=1ifinAgricultureof Member(commercial, subsistence, pastoralism) and 0 otherwise		OCCUPD	0.39	0.49
Highest Level of education attained (three categories:	=1 if in primary (std.1-8 and KCPE) and 0 otherwise	PRIMARD	0.78	0.41
primary, secondary and university)	=1 if in secondary and certificate (Form 1-4,	SECOND	0.41	0.49

Table 3: Definition of variables to be used in the estimated equations

	KCE/KCSE/KAC and other post-secondary certificate) and 0 otherwise =1 if University and degree and 0 otherwise	UNIVD	0.041	0.20
Area of Residence	=1 if rural and 0 otherwise	RURBAN	0.64	0.48
Time taken to reach work place during peak and off peak	Units (Minutes)	TRANSPOT	18.60	25.33
Time taken to fetch water for domestic use	Units (Minutes)	WATER	11.56	20.95
Type of toilet facility used	=1 if Bush and 0 otherwise	SANITARY	0.19	0.39
County dummies: Mombasa County; County; Nakuru for Garissa for Garissa (

3.6 Multicollinearity Problem:

It was expected that the explanatory variables may be highly correlated. This problem could bias the econometric analysis. Specifically, for dummy predictor variables, it could lead to a dummy variable trap.

We deal with multicollinearity by reducing the number of dummy variables by 1 and using that variable as a reference variable. For example, Kakamega County was dropped and thus used as a reference dummy variable and thus was not included in the analysis. Thus biasness due to multicollinearity was effectively dealt with.

It is worth noting that failure to control the dummy variable trap and thus multicollinearity could affect the signs of the dummy variables as well as the standard errors

3.7 Data and Data Sources

This study uses the data from the 2005/6 Kenya Integrated Household Budget Survey. The KIHBS 2005/6 was published by the Ministry of Planning and National Development. This data is chosen for analysis because of a number of reasons: First, it is the latest available official data that has information on welfare and poverty. Secondly, it covered the whole country and thus useful for national analysis. Lastly, the data was the most comprehensive and well informed in Kenya compared to other welfare surveys that had been previously collected.

The survey was conducted in 1339 randomly collected clusters across all districts in Kenya comprising 857 rural and 482 urban clusters. Each cluster had about 10 households giving a total of about 13390 households in the sample. Since each household had an average of five members, the expected number of observations is about 66000. However, it is noteworthy that four clusters were not surveyed. These include: one in Marsabit, one in Marakwet, and two in Samburu. These areas were insecure situations thus sampling weights were adjusted for cluster non response (Republic of Kenya, 2007). The Survey was undertaken in four questionnaires: (a) A 21-module household questionnaire; (b) A 14-day household expenditure diaries to record consumption and purchases; (c) A market price questionnaire; and (d) A community questionnaire. Through these questionnaires, household information relevant for poverty analysis was obtained. The data was collected for 12 months beginning from May 2005.

The sample being used in this study had a total number of 13,212 households. The unit of analysis is the household. This choice is based on the assumption that members of a household

share resources. It is noteworthy that even though the data used is of high quality, seasonal variation as well as misrepresentation of some districts in the North Eastern region may affect the analysis. Moreover, the County analysis is based on the boundaries that were created in 2010 by the Constitution of Kenya (Republic of Kenya, 2010) yet the data was collected in 2005.

The analysis uses a number of explanatory variables including age, gender, household size, employment, education level, area of resident (whether rural or urban), County of residence and time taken collecting water and other sources of energy. The estimation is made at household level since this was the major driver of this paper.

CHAPTER FOUR: ESTIMATION RESULTS

4.1 LOGIT REGRESSION EQUATION

This study has used the probability of being poor (poverty based on consumption per capita) as a dependent variable. The explanatory variables used are in a way related to one's susceptibility to poverty. These include household characteristics such as sex, age, marital status, household head, household size, occupation, employment sector, level of education, time taken to reach work place as a proxy to road network, time taken to collect water, area of residence (rural or urban) and county of residence (Nairobi, Mombasa, Kisumu, Nyeri, Embu, Nakuru, and Garissa) (see table 3).

The estimation was made with an approximately 13212 households. In each household, the characteristics are assumed to affect all the household members equally, thus an indicator of their welfare. We use the household as a unit of analysis having assumed that all the resources at their disposal are shared equally among household members. It is as well assumed that the characteristic of the household head represents the individual household members. These include level of education, occupation and employment sector. Upon undertaking the logit regression, the number of observations turned out to be 9681 and not 13212. This is normal with stata because it uses a likewise deletion by default in which case stata deletes any observation that has missing values. This results to the use of smaller number of observations in the logit analysis compared to the total number of observations in the data set. The results are shown in table 6 under the annex.

The logit estimation shows that household size, area and county of residence, roads (time taken to go to work as a proxy to road infrastructure), water (time taken to collect water as a proxy to accessibility to water), gender, and age are significant determinants of poverty in Kenya. Other

insignificant determinants (at 10 per cent confidence level) include employment sector, occupation, level of education, marital status and sanitation.

Given that the β s are the coefficients of the respective variables in the logit regression, the logit equation based on table 6 is defined as:

$$\begin{split} \log it(p) &= 0.149 + 0.403 hhsize - 0.511 rurban + 0.518 nairobi \\ &+ 0.777 mombasa - 0.237 kisumu + 0.038 nyeri - 0.664 nakuru \\ &+ 0.303 embu + 2.06 garissa - 0.173 hhead - 0.0351 age + 0.397 sexd + 0.0004 age 2 \\ &- 0.006 transpot + 0.082 emp \sec d + 0.0598 occupd - 0.011 primard \\ &- 0.055 \sec ondd - 0.222 univd + 0.0086 marymono + 0.042 marypoly + 0.0076 water - 0.135 sanitation \end{split}$$

where p is the probability of being poor.

The logit model reports coefficients of the predictor variables in log – odds units. They show the expected change in the log-odds of being poor for a unit increase in the corresponding predictor variable, holding all other variables constant at a certain value.

Since the study is mostly interested in the marginal effects, we shall only interpret the coefficients of two predictor variables for illustration purposes. For example, the coefficient of household size is 0.403. This implies that increasing the size of the household by one member increases the log odds of being poor by 0.403 log odds units. For a categorical variable such as household head, the coefficient is -0.173. This means that a change in household headship from female to male reduces the log odds of being poor by 0.173. These results imply that poverty reduction strategies should focus on reducing the size of the household while advocating for headship of households to be taken by male.

Meanwhile, from the logit regression, we find other statistics that are worth explaining. They are explained as follows:

The log likelihood is -3989.6196. This is the log likelihood of the final model. The value of the log likelihood has no statistical meaning as far as the effects of the changes in the predictor variables and the probability of being poor are concerned.

The likelihood ratio (LR) chi-square test. LR chi2 (23) = 1292.43. The number in parenthesis, 23 is the number of degrees of freedom, reflecting the number of predictors in the logit model. The LR is given by minus two times the difference between the starting and the ending log likelihood. That is -2(-4635.8333+3989.6196) = 1292.43.

Prob > chi2 = 0.000 is the probability of obtaining the chi-square statistic (1292.43) given that the null hypothesis is true. That is, this is the probability of obtaining the chi-square if there is no effect of the predictor variables on the dependent variables. This is the p-value which we compare to a critical value to determine if the overall model is statistically significant. The logit model is statistically significant since the p-value is 0.0000.

4.2 MARGINAL EFFECTS AFTER LOGIT (dy/dx)

After logit, we do a marginal effect analysis so as to get the effects of a unit change of each of the predictor variables on the probability of being poor. As presented in table 7 under the annex, the equation now becomes:

$$\begin{split} p_i &= 0.0462 hhsize - 0.0551 rurban + 0.05 nairobi + 0.0674 mombasa - 0.0295 kisumu \\ &+ 0.0043 nyeri - 0.0953 nakuru + 0.0312 embu + 0.1149 garissa - 0.0193 hhead - 0.004 age \\ &+ 0.0519 sexd + 0.00005 age 2 - 0.0006 transpot + 0.0092 emp \sec d \\ &+ 0.0068 occupd - 0.00129 primard - 0.00636 \sec ondd - 0.0274 univd + 0.00099 marymono \\ &+ 0.0048 marypoly + 0.00087 water - 0.0159 sanitation \end{split}$$

The marginal effects measure the instantaneous rates of change of the probability of being poor for unit increase in continuous variables (Richard, 2015) and the discrete changes of dummy variables from 0 to 1 (Halvorse and Palmquist, 1980). That is, they measure how the predicted probability of being poor changes as the binary independent variables change from 0 to 1, holding all other variables at their means. It is worth noting that for the continuous variables, the instantaneous rate of change in the probability of being poor may or may not be close to the effect on the probability of being poor of a one unit increase in the variable in question.

Some of the marginal effects of the predicted variables are as follows:

Firstly, when the size of the household increases by one person, the probability of that household being poor increases by 0.0462. This implies that increasing the size of the household by one person increases the poverty level of that particular household by 4.62 per cent.

Secondly, a one year increase in the age of a household member reduces the probability of that household being poor by 0.4 per cent. This implies that as the members of a household age, the poverty status of their household improves. This improvement is based on the assumption that individuals accumulate resources for use by the household as they age. For instance, as people age, they tend to acquire better education and better jobs with better returns for provision of the needs of the household. Moreover, as the age of household members increase exponentially, that is age squared, the probability of the household being poor increases by 0.005 per cent. This occurs as a result of poor social security services that expose the retirees to poor welfare.

Thirdly, a minute increase in the time taken to collect water by a household increases the probability of that household being poor by 0.09 per cent. This implies that as households take more and more time to collect water, their poverty situation worsens. This also applies to other

sources of energy such as firewood and electricity. The closer these sources of energy are to the households, the better their livelihoods are.

In general, these marginal effects show that increasing the size of the household as well as the time taken to collect water instantaneously increases the probability of a household being poor while increasing the age of a member of household instantaneously reduces the probability of being poor. Thus household size and time taken to collect water are directly related to the poverty status of a household. These findings are consistent with Oyugi (2000), Mwabu et al. (2001) and Kariuki (2006).

Focusing on categorical predictor variables, the predicted probability of a household being poor reduces by 5.51 per cent as a household shifts from rural to urban residence. This implies that poverty level in the rural areas is 5.51 per cent higher than poverty levels of households in the urban areas. Thus poverty statuses of households worsen as households move from urban to rural areas.

As the headship of the household changes from female to male, the probability of that household being poor increases by 1.93 per cent. In other words, female headed households are 1.93 per cent poorer than male headed households. This shows that the gender of a household head is critical and may inform the resources that the household may acquire for use in enhancing their welfare.

Even though education level is not significant (at 10 per cent confidence level), the results show that those that have not acquired primary education are 0.1 per cent poorer than those with primary education. For secondary education, those who have no secondary education are 0.6 per cent poorer than those with secondary education. Similarly, those that have not acquired

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university education are 2.74 per cent poorer than those with university education. These findings show the rate at which poverty status of households improves on the basis of the level of education that members of a household have attained. The higher the level of education one has attained, the lower the poverty level. Thus investing in education is very critical as a poverty reduction strategy.

The results also show that poverty levels change as a household shifts from one county to the other. For example, those households in Kakamega County are 4.9 per cent poorer than households in Nairobi County. Similarly, households in Kakamega County are 3.4 per cent poorer than households in Embu County.

Based on the poverty incidence, the study shows that male headed households are less likely to be poor compared to female headed households. In fact, the study shows that 37.5 per cent of male headed households are poor while 42.3 per cent of female headed households are poor (see figure 4).

On the same note, the results show that households that reside in the rural areas are more likely to be poor than the urban dwellers. That 46.9 per cent of rural households are poor while only 24.6 per cent urban households are poor. Moreover, households engaged in agricultural activities have shown higher probabilities of being poor. The results show that 41.7 per cent of households engaged in agricultural activities are poor while 37.1 per cent of those engaged in non - agricultural activities are poor (see figure 4).

The results show that about 57.3 per cent of the households take more than 50 minutes to collect water. This is in agreement with Kariuki (2006) who found out that time taken to fetch water determines the level of poverty of a household (see figure 4).

Household size is as well a major determinant of poverty in Kenya. The results show that about 20 per cent of household with three or less members are poor while about 57.3 per cent of households with seven or more members are poor. This is in line with the findings of Mwabu et al. (2001), Oyugi (2000) and Kariuki (2006) (see figure 4).

Figure 4 shows the percentage poverty levels as per the independent variables.



Figure 4: Poverty levels

Source: Author's own construction

In figure 5, poverty levels of the sampled counties are shown.



Figure 5: Household Poverty levels by County



From figure 5, Garissa County is the poorest with a poverty level of about 47.9 per cent while Nairobi County is the least poor with a poverty level of about 10.9 per cent.

While comparing the study findings with that of the Government in 2007 for the 2005/2006 KIHBS, we find that they are comparable. The comparison is presented in table 5. The table shows that while the Government's household absolute poverty levels were 42.0, 27.4 and 38.3 per cent for rural, urban and National levels respectively, the study gives 46.9, 24.6 and 38.9 per cent respectively for the same.

CHAPTER FIVE: POLICY IMPLICATIONS AND CONCLUSION

5.1 POLICY IMPLICATIONS

This paper has explored the determinants of poverty in Kenya. Logit regression analysis has been done using 2005/2006 Kenya Integrated Household Budget Survey data. Based on the estimation results so far obtained and the motivation of the research, the following policy implications can be drawn:

First and foremost, county of residence has turned out as a major determinant of poverty. Poverty levels vary from Nairobi to Mombasa to Garissa and to other counties. In fact, different counties should invest in improvement and effective use of different resource endowment such as wind energy in Garissa for the purpose of elevating people from poverty. Cultural practices and belief systems that take counties aback should be done away with, for example those against girl-child education and those for female genital mutilation (FGM). Considering the poverty incidence (table figure 3), Garissa county has the highest poverty rate at 47.9 per cent followed by Kakamega at 42.8 per cent. The data points out that the least poor county is Nairobi with a poverty rate of about 10.9 per cent. These results indicate that there are county-resource differentials and policies to tap different resources within the counties and as well as making good use of devolved funds for county development are welcome. In this regard, every county should adopt county-specific and sustainable poverty reduction strategies to improve the welfare of its people. Those countries with poor transport infrastructure should embrace improving them while those counties that lag behind in health, agriculture, education infrastructure should be on the go to ensure that households in these particular counties do not suffer from poverty.

Secondly, and in line with previous research work, poverty has been found to be concentrated in rural areas than urban areas and particularly in the agricultural sector. Thus improvement of the rural infrastructure is called for. The basic infrastructure facilities such as transport services, water and sewerage services, waste management and disposal services as well as environmental conservation within the rural areas should be improved. Feeder roads should be developed to improve to agricultural produce and market access in the rural areas. Clean and safe water should be provided in the rural areas coupled with better and improved water conservation and storage systems especially during rainy seasons. These systems will provide enough water for livestock use, domestic use, and industrial use as well as for irrigation to improve the rural agricultural output. Moreover, proper rural waste management and disposal systems will help prevent diseases such as cholera and typhoid that cause havoc in the rural areas. These notwithstanding, afforestation, use of solar energy and rural electrification will go hand in hand with the provision of alternative and safe sources of energy that conserve the environment. The government, in particular, the county governments should invest in policies that improve the infrastructure of the rural areas within their counties with a view of bridging the gap between the urban and the rural in terms of poverty incidence. The Ministry of industrialization in all the counties in conjunction with other relevant ministries should come up with holistic rural improvement policies as a way of reducing poverty within the counties. These policies will go hand in hand to create employment opportunities, raise the levels of incomes of the people and further reduce poverty in a sustainable way.

Thirdly, since Kenya is an agricultural country and agriculture is mostly concentrated in the rural areas, improving the rural infrastructure implies improving agriculture. It is important therefore that county policy makers should streamline the agricultural sector through productive policy

initiatives such as land upgrading, irrigation agriculture, cheap farm inputs, fair prices of agricultural outputs, compensation of workers in the event of loss due to natural calamities, strengthening agricultural unions through which farmers can air their grievances, proper research and development in agriculture to improve technology and enhance productivity in the sector. These should go hand in hand with efficient and reliable early warning systems and storage facilities to cushion the farmers from unpredicted losses and possibly beef up county and national food security. Farmers should as well access affordable loans to enable them meet the costs involved in agricultural work. Further, investing in improving the quality of agricultural land is necessary, given that size of land at the disposal of a household has played minimal role if any in determining poverty. Moreover, policies should be in place to protect agricultural land from encroachment by the rapidly expanding real estate developments. Finally, more funds are should be allocated to the agricultural sector in the national and County budgets to help refine agricultural technological advancement aimed at exporting refined agricultural produce rather than primary exports.

Fourthly, even though our study showed that education was not a significant factor affecting poverty (at 10 per cent level of confidence), having attained good education especially secondary and post- secondary education (university and other tertiary levels) lowers the chances of an individual becoming poor. In this regard, the national and county governments should work towards developing and implementing quality and up to date educational policies that would improve universal access to quality and affordable (perhaps free) secondary and post-secondary education. Promoting education is critical in poverty reduction since education provides a basic way to access better opportunities that improve the welfare of individuals and cushion them from poverty. This will translate into enhanced human security. Much more should as well be done to

address the industrial unrests that are ever witnessed as the teachers demand salary increments. The Teachers Service Commission should at all times be in consultation with other education stakeholders to foresee a better and more reliable education system.

Other policy initiatives that would promote education include reducing teacher-student ratios especially in the institutions of higher learning; restructuring and re-establishment of technical institutions, most of which have been converted to universities; monitoring and evaluation of the curriculum to ensure that it meets the current national and international job market demands; and putting in place an inclusive education system that engages the mentally and physically challenged, the youth, the aged, men and women, the poor and the street children. Further, an inclusive policy should be formulated to address the ever existing mismatch between the school leavers entering the job market and the jobs available in the market. In this regard, institutions of learning should engage the industries with a view of producing graduates with market relevant skills. In fact, the National Industrial Training Authority should be up to its task of attaching students to industries to embrace the needs of the labour market. This will perhaps reduce poverty as graduates get into the job market and are most likely to fit immediately.

Finally, as counties and the national government formulate the policies so far implied, the study recognizes the need to advocate for a smaller size of the household since those households with smaller sizes are less likely to be poor compared to the large sized households, holding all other factors constant. Further, it is advisable that counties and the national government embrace environmental friendly poverty reduction strategies. These strategies will go hand in hand with the conservation of the environment and reducing the chances of the future generation from being poor due to resource depletion.

5.2 CONCLUSION

Poverty remains a challenge to Kenya both at national and county levels despite the many policy initiatives by the national and county governments. We conclude therefore that with devolution in place and that county of residence is contributory to poverty levels, sustainable county specific poverty reduction policies are a must to reduce this menace.

As a result, it is critical that both the national and county governments invest more on research and science and technology development that are determinant oriented and county specific. Focus should be on basic services such as roads, health, resource use and management, education and agriculture. These could inform more relevant and up-to-date policy initiatives aimed at reducing poverty within the counties in particular and Kenya in general. It will as well improve the quality of life of the people thereby increasing their productivity and enhancing economic growth.

In particular, the management of devolved funds is very critical in terms of prioritization so as to focus on projects that improve the quality of life. Furthermore, positive intergovernmental involvement (county and national) engagements in economic development as well as public participation in issues of economic importance are of greater value in the journey towards sustainable poverty reduction.

ANNEX

Tuble 4.1 Over ty maleators in Kenya asing 2005/2000 Killibb (70	Table 4: P	overty indicate	ors in Kenya	using 2005/200	6 KIHBS (9	%)
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		HEAD COL	HEAD COUNT ($P\alpha=0$)			SEVERITY
						OF
					(Pa=1)	POVERTY
						(Pa=2)
REGION	POVERTY	Adult	Households	Individuals	Adult	Adult
	MEASURE	Equivalent			Equivalent	Equivalent
Rural	Food	47.2	38.5	47.2	16.2	7.9
	Overall	49.1	42.0	49.7	17.5	8.8
	/Absolute					
	Hardcore [*]	21.9	18.0	22.3	6.9	3.3
Urban	Food	40.5	31.2	40.4	13.0	6.1
	Overall/Absolute	33.7	27.4	34.4	11.4	5.5
	Hardcore	8.3	5.9	8.3	2.5	1.1
National	Food	45.8	36.7	45.8		
	Overall/Absolute	45.9	38.3	46.6		
	Hardcore	19.1	14.9	19.5		

Source: Republic Of Kenya, Basic Report on Well-Being, 2007.

* the hardcore poor are those who are poor even if they spend all their income on basic food needs only and neglect other expenditures.

Note:

The food poverty lines used are Kshs. 988 and Kshs. 1474 for rural and urban areas while the absolute/overall poverty lines are Kshs. 1562 and Kshs. 2913 for rural and urban areas respectively. The hardcore poverty lines are Kshs. 988 and Kshs. 1474 for rural and urban areas respectively. The food poverty lines are based on expenditures that give the basic daily energy requirement (approximately 2250 kilocalories per adult equivalent per day).

The percentages shown in table 4 are of those individuals who fall below the respective poverty lines in each case.

The data in table 4 shows that in general, poverty is high in rural areas (49.1 per cent) as compared to urban areas (33.7 per cent) for the case of absolute poverty. Similarly, the food poor are also more in the rural than urban areas with the percentages of the food poor being 47.2 and 40.5 in rural and urban areas respectively. This trend is the same for the hardcore poor in which about 21.9 per cent are in the rural areas while only 8.3 per cent are urban dwellers. Considering national poverty, about 45.8 per cent of Kenyans are not able to meet their basic daily energy requirement while about 46 per cent have their expenditures not able to meet their basic food and non- food needs.

Table 5: Comparison of the Research Findings and those of the Government in 2007 for the2005/6 KIHBS.

Region	Headcount Poverty by Household (per cent)			
	Government*	Author**		
Rural	42.0	46.9		
Urban	27.4	24.6		
National	38.3	38.9		

Source:* Republic of Kenya - Basic Report on Well-Being, 2007.

** Author's own computation

Pov_cpc	Coef	Std. error	Z	P> Z
(probability of				
poverty)				
Hhsize	0.4026	0.0183	21.94	0.000
Rurban	-0.511	0.0724	-7.05	0.000
Nairobi	0.5179	0.1494	3.47	0.001
Mombasa	0.7769	0.2907	2.67	0.008
Kisumu	-0.237	0.211	-1.12	0.261
Nyeri	0.038	0.181	0.21	0.833
Nakuru	-0.664	0.157	-4.24	0.000
Embu	0.303	0.222	1.37	0.172
Garissa	2.055	0.730	2.82	0.005
Hhead	-0.173	0.0811	-2.13	0.033
Age	-0.035	0.0087	-4.03	0.000
Sexd	0.397	0.119	3.34	0.001
Age2	0.00044	0.0001	4.35	0.000
Transpot	-0.0055	0.001	-5.48	0.000
Empsecd	0.0818	0.747	1.10	0.273
Occupd	0.0598	0.0593	1.01	0.314
Primard	-0.0113	0.0813	-0.14	0.889
Secondd	-0.0553	0.0608	-0.91	0.363
Univd	-0.222	0.1403	-1.58	0.114
Marymono	0.0086	0.078	0.11	0.912
Marypoly	0.0419	0.105	0.40	0.689
Water	0.0076	0.0018	4.13	0.000
Sanitation	-0.135	0.0779	-1.73	0.084
_Cons	0.1489	0.1957	0.76	0.447

Table 6:	The	Binomial	logit	model	using	consum	ption	per car	pita

Log likelihood = -3989.6196

Number of observations = 9851

LR chi2 (23) = 1292.43

Prob > chi2 = 0.0000

Pseudo R2 = 0.1394

Variable	dy/dx	Std. error	Z	P> Z
Hhsize	0.0462	0.0018	25.59	0.000
Rurban*	-0.0551	0.0073	-7.57	0.000
Nairobi*	0.05	0.012	4.18	0.000
Mombasa*	0.0674	0.0182	3.70	0.000
Kisumu*	-0.0295	0.0284	-1.04	0.299
Nyeri*	0.0043	0.0202	0.21	0.831
Nakuru*	-0.0953	0.0271	-3.52	0.000
Embu*	0.0312	0.0204	1.53	0.125
Garissa*	0.115	0.0145	-7.94	0.000
Hhead*	-0.0193	0.009	-2.18	0.029
Age	-0.004	0.001	-3.98	0.000
Sexd*	0.0519	0.0176	2.95	0.003
Age2	0.00005	0.00001	4.31	0.000
Transpot*	-0.0006	0.0001	-5.48	0.000
Empsecd*	0.0092	0.0083	1.11	0.265
Occupd*	0.0069	0.0068	1.01	0.314
Primard*	-0.0013	0.0093	-0.14	0.889
Secondd*	-0.0064	0.007	-0.91	0.363
Univd*	-0.0273	0.0186	-1.47	0.141
Marymono*	0.001	0.009	0.11	0.912
Marypoly*	0.0048	0.0118	0.41	0.685
Water	0.0009	0.0002	4.14	0.000
Sanitation*	-0.0159	0.009	-1.68	0.093

*dy/dx is for discrete change of dummy variable from 0 to 1

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