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INFLUENCE OF COMMERCIALIZATION OF SMALL SCALE VEGETABLE FARMING ON POVERTY ERADICATION IN SABOTI CONSTITUENCY

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Abstract*: Kenya's smallholder agriculture remains a major engine of rural growth and livelihood improvement, yet it is largely semi-subsistence. A more commercialized production system can transform the subsistence-oriented production system into a market-oriented production system as a way of increasing the smallholder farmer's income, welfare outcomes and hence reduce rural poverty. This study sought to describe the effects of commercialization of small-scale vegetable farming on poverty levels in rural Kenya. It was carried out in Saboti constituency of Trans Nzoia County. The specific objectives were: To establish the production level of small scale vegetable farmers and the effect this has on poverty levels in Saboti constituency; to find out how the full exploitation of potential available marketing channels for small scale vegetable farmers affects the poverty levels in Saboti constituency; and to explore the effect of asset endowment of small scale vegetable farming on poverty levels in Saboti constituency. This study adopted a descriptive survey research design, which ensures the collection of qualitative and quantitative data. The study covered small-scale farmers in Saboti constituency, using a sample of 316 respondents from a target study population of 1500. Structured questionnaires were the research instruments used in data collection. Multiple regression analysis technique was used to determine the effect of independent variables on the dependent variable, and to measure the relative influence of each independent variable based on its covariance dependent variable. Data was analyzed using statistical package for social science,(SPSS version 16) and thereafter presented in tables. In the research findings, it was established that the production level of vegetables among small-scale farmers was low and therefore did not help in reducing poverty level. From the study, it was observed that most farmers did not exploit available markets and marketing channels for their products, they relied on intermediaries who bought their produce at the farm gate; such a move hindered them from selling their produce at better prices hence benefit socio-economically from it. Low level of production of vegetable did not enhance a saving culture, it hindered small-scale farmers from accumulating wealth from it hence lowering the asset endowment of farmers; thereby, sustaining low standards of living.

***Keywords:* Production level, Market availability, Asset endowment and Poverty level.**

1. INTRODUCTION

Background of the study:

Poverty level refer to an international monetary threshold under which an individual is considered to be living in poverty, which is calculated by taking the value of the goods needed to sustain one adult-and converting it to dollars per day (Govereh et al., 2009). The rural population mainly depends on small-scale agriculture for food and income; this then suggests that smallholder agriculture remains the major engine of rural growth and livelihood improvement for any

pathway that can lift large numbers of the rural poor out of poverty (Hazell, 2009). Increasing rural incomes will require some form of transformation out of the semi-subsistence, low-input, low-productivity farming systems that currently characterize much of rural areas or in relative terms by anchoring the poverty line to mean or median income levels (Ravallion and Chen, 2010).

Commercialization of agriculture benefits the poor by increasing agricultural labor productivity, which in turn generates employment in low-capital smallholder agricultural production. Both the households that are commercializing their production and hired laborers receive direct income benefits (Jumbam and Betek, 2014). However, the authors also cautions that, while commercialization by itself rarely has adverse consequences on household welfare, commercialization combined with failures of institutions, policies, or markets can be damaging. While there is a general agreement that improving market access and commercialization of smallholders will help induce greater investment, productivity, and income, there remains several challenges in making progress. Some of these challenges include identification of output markets and types of commodities that can enable large numbers of smallholders to improve their incomes; identification of which markets and commodities can provide significant opportunities for the poor; and identification of constraints and interventions that are important for improving access to markets by the poor. It is a complex and dynamic process involving several dimensions related to technology, markets, finance, institutions, infrastructure, and social structure.

Table 1.1: Annual Analysis for Income Based on ¼ Acre of Vegetables

Category	Vegetables	Number of harvests per year	Annual production cost	Annual gross earnings	Annual profit
African leafy vegetables	Amaranth	8	1142	5714	4571
	Cowpeas	7	1306	3733	2426
	Nightshade	5	1633	4666	3033
Exotic vegetables	Kales	4	1440	3200	1760
	Spinach	3	1400	2800	1400
	Cabbages	3	1440	2400	960

Source: (Mumbi et al 2013)

Globally, commercialization of small-scale vegetable farming has been one of the ways of achieving high value agricultural products markets to meet the global priority of every government of meeting the basic food requirements of the rural population. According to Kem (2017), over time, Cambodian smallholders in agriculture have transitioned from small-scale subsistence production of horticultural produce to semi-commercial where land sizes under production of vegetables and cash crops increased because of the increased demand from the international markets. Livelihood status of smallholders have increased for the past one decade, a move that has improved the economy of the country. In Sri-Lanka, Rosairo (2016) reported that most smallholders in agriculture especially of vegetable and horticulture are entrepreneurial in nature. The education background, experience, age, size of farm, location, and gender determine the level of entrepreneurial ability imparted in vegetable farming. Indisputably, most of the smallholders are supported by local governments,which provides extension services, credit, and help smallholders in accessing external markets, a move that improved the socio-economic status of the farmers.

Regionally, In Ethiopia, past efforts to improve small-scale vegetable smallholder farmers' access to markets through market reforms have largely been ineffective. (Pender and Alemu, 2007).Consequently, majority of smallholder vegetable farmers still produce largely for subsistence needs, producing small marketable surpluses and faces thin markets. Government offers limited extension services, and access to credit is for those endowed socio-economically. Xaba (2013) observes that smallholders in agriculture, who produce for subsistence purpose, are characterized by low activity, minimal labor engagement in farms, and non-competitiveness in terms of marketing and enhancing quality. The farmers face difficulties in transporting their produce to the markets, which often force them to sell at the farm gate. The commercialization of smallholder agriculture is often viewed as an opportunity for economic growth and development for less-developed countries whose economies depend on agriculture largely. The literature on "positive income effects of the commercialization of high-value export crops, in Senegal (Maertens and Swinnen, 2009), Ghana (Afari-Sefa, 2007), and Zimbabwe (Henson *et al*., 2005)" supports smallholder horticultural commercialization as a means of reducing poverty at the household-level. The Millennium Development Project's Hunger Task Force concluded in 2005 "the world could meet the millennium development goal of halving hunger by 2015, and that development of agriculture is critical to that

goal (World Bank, 2007). The role of small-scale vegetable farming in poverty reduction and economic growth is very significant in light of the current realities that 1.5 billion farm households live in rural areas of the developing world (World Bank, 2007). The rural population mainly depends on small-scale agriculture for food and income. This suggests that small-scale vegetable farming remains the major engine of rural growth and livelihood improvement through increasing rural incomes.

Locally, In Kenya, according to HCDA 2014 annual report horticulture production (especially vegetables) is an important source of income for smallholder farmers smallholders' and accounts for more than 70% of the total horticultural output. This is because horticulture has higher returns than almost all other agricultural products and is suitable for production on small and marginal farms in varying climatic conditions. In a study conducted by Muriithi and Matz (2014) in the highland regions of Kenya, the authors sought to establish small-scale farmers' participation in commercialization of vegetable and in their findings, they established that most smallholder farmers sell produced vegetables at the farm gates, most of them do not participate or explore local and external markets. The intention of farming is for consumption not marketing. Kenya's Horticultural Crops Development Authority (HCDA 2014) annual report, also estimates placed smallholder export market shares at 40% for fruit and 70% for vegetables, implying an overall horticultural share of 55% to 60% of Kenya's total export. The vegetable subsector continues to lead by value as compared to the other horticultural sectors because of high domestic demand with vegetable like potatoes forming the staple good in some areas of Kenya. National horticultural validated report of 2013 on industry performance indicated that vegetables like potatoes, tomatoes, carrots, kales and cabbages had the highest value constituting 94% of the total value of vegetables. Initiatives by the government to expand the area under irrigation have resulted in an increase in production particularly for short cycle vegetables like cabbages, carrots and kales. However, the main challenge has always been inaccessibility to quality seeds, lack of value addition technologies and high postharvest losses.

Statement of the Problem:

Commercializing smallholder agriculture is an indispensable pathway towards economic growth and development for most developing countries that rely on the agricultural sector (Jumbam and Betek, 2014; Cervantes-Godoy and Dewbre 2010).In the long run, subsistence agriculture may not be a viable activity to ensure sustainable household food security and welfare (Nahanga, and Becvarova, 2016). In their study on "Market participation by vegetable farmers in Kenya: A comparison of rural and peri-urban areas" by David JakindaOtieno, John Omiti, Timothy Nyanamba, and Ellen McCullough (2009) shown that there is need for appropriate statistical evidence to prove that different strategies of agricultural products marketing are required for different environments and landscapes, especially if we have to ensure food security and improved farm incomes in the rural and peri-urban areas. In the study, they concluded that there is need to improve market information provision, develop farmers, business skills, improve roads and support establishment of high value vegetable market outlets at different scales in rural and peri-urban areas. They said there is potential to replicate the intervention in other areas within the country, with a focus on delivering the vegetables to respective nearby urban centre. With the promotion of the nutritive value of the indigenous vegetables and the training of farmers in their production, demand and supply of the vegetables are likely to go up.

World bank (2008), in the world development report indicated that in sub-Saharan Africa, poverty rate remained above 50% for the last ten years and that most rural poor ,who are estimated at 86%(2.5 billion people) depend, directly or indirectly, on agriculture for their livelihoods and agriculture also provides jobs for about 1.3 billion small holders and landless workers.Children will always form a big percentage of the future generation and world health organization reported in WHO (2012) estimated that a quarter of the word's 162 million young children under the age of five years are stunted, meaning they are having inadequate height for their age and they are still suffering from chronic under nutrition. UNCTAD (2014) reported one in every five persons in developing regions of which Kenya is one, lives on less than $1.25 per day and this is below poverty line. This report also states that a more dynamic and inclusive agricultural sector could dramatically reduce rural poverty. Kenyan vegetable smallholder farmers still produce largely for subsistence needs, the influencing factors may be different for different contexts. The main contributing factors are farmers' perception, information availability on the available markets for the variety of vegetables, ways of improving production so as to produce in excess of their domestic needs and have surplus for sale and access to credit. With the knowledge that land has continued to be subdivided into smaller portions due to population growth and that maize faming continue to draw less and less income then, the farmers needs alternative to augment these declining incomes from maize and dairy

farming. The way forward is to commercialize smallholder vegetable farming. Vegetable are also short season crops. Therefore, the purpose of this study was to find out the influence that commercialization of small scale vegetable farming has on the small-scale vegetable farmers' income in Saboti constituency, Kenya.

Purpose of the Study:

The overall objective of this study was to assess the influence of production levels, marketing channel, and asset endowment has on poverty levels among small-scale vegetables farmers' in Saboti constituency of Trans Nzoia County.

Research Objectives:

I. To establish the effect of production levels by small scale vegetable farmers on their poverty levels among small scale vegetable farmers' in Saboti constituency.

II. To find out how the full exploitation of potential available marketing channels for small-scale vegetable farmers affects the poverty levels among small-scale vegetable farmers' in Saboti constituency.

III. To determine how assets endowment for small-scale vegetable farmers effects poverty levels among small scale vegetable farmers' in Saboti constituency.

Research Questions:

I. How does the production levels of vegetables by small scale vegetable farmers affect poverty levels among small scale vegetable farmers' in Saboti constituency?

II. To what extent does exploitation of the potential marketing channels for vegetables by small scale vegetable farmers affect poverty levels among small scale vegetable farmers' in Saboti constituency?

III. How does the level of assets endowment for small-scale vegetable farmers affecting poverty levels among small-scale vegetable farmers' in Saboti constituency?

Research Hypotheses:

I. $H0_{1:}$ Production levels of small scale vegetable farmers' have no effect on poverty levels among small scale vegetable farmers' in Saboti constituency.

II. $H0_{2:}$ Exploitation of the potential Marketing channels for small scale vegetable farmers' have no effect on poverty levels among small scale vegetable farmers' in Saboti constituency.

III. $H0_{3:}$ Assets endowments of small scale vegetable farmers' have no effect on poverty levels among small scale vegetable farmers' in Saboti constituency.

Justification of the study:

Vegetables are important for both domestic and export markets. Almost all households in Kenya include vegetables in their diets. Nutritionally, vegetables are good sources of vitamins, protein minerals and fiber. The smallholder farmers who have engaged in subsistence and semi-subsistence agriculture have a lower marketable surplus (low return) causing them to be in a low equilibrium poverty trap. A leap that smallholder farmers need to make towards poverty and hunger eradication is to transform from the low marketability semi-subsistence farming to high level market-oriented farming.

This study sought to close this gap by commercialization of small-scale vegetable farming in rural Kenya specifically in Saboti constituency. Such a study had not been done in this region and for that reason, undertaking this research would provide an insight to small-scale vegetable farmers to understand activities and trends in small-scale vegetable commercialization. The study findings were important to small-scale vegetable farmers in Saboti, in helping them to understand the factors that are influencing commercialization of vegetable farming and in so doing; small-scale vegetable farmers are expected to start taking vegetable farming as a commercial venture. The small-scale vegetable farmers are expected to be exposed to available marketing channels for their vegetables and hence be more proactive in embracing the idea of vegetable growing as an enterprise, which results into improved the household income to reduce poverty levels.This study finding exposed farmers to available information on asset endowment, helping them to improve on the strategies of economical production and marketing of vegetables. The study highlights the factors that limit commercialization of vegetable farming and enables the stakeholders to apply appropriate counter measures.

Significance of the study:

Findings of this study will be beneficial to small-scale farmers, government, and Non-Governmental organization. Small-scale vegetable farmers will use the findings of this study to identify their potential in terms of production, and marketing of their produce. They will learn that selling their vegetable at the farm gate is not economical because it earns low returns as opposed to exploring other markets such as local shopping centers, city markets, and external markets, whose returns are high. The government will use the findings of this study to enhance extension services to smallholders of vegetable farming who can learn modern ways of farming aimed at increasing output. The government might also use findings of this study to amend banking laws and provide a good environment for financial institutions to increase access to credit especially to small-scale vegetable farmers. Non-Governmental Organizations can use the findings of this study to increase sensitization and education to small-scale farmers in order to reduce poverty levels among the group.

Scope of the study:

The study was carried out in Saboti Constituency, which is one of the five electoral constituencies in Trans-Nzoia County. Saboti Constituency is in the Upper Highland agro-ecological zone. Saboti Constituency lies between altitude 2,400 and 4,313 metres above sea level. It covers an area of 323.6 sq.kms, with five administrative wards, that is, Kinyoro; Matisi; Tuwani; Saboti and Machewa (IEBC Trans Nzoia, 2013). The Constituency had a total population of 1,500 small scale vegetable farmers. The study examined the influence of commercialization of small-scale vegetable farming on poverty eradication in Saboti constituency. The study research design was descriptive and involved small scale vegetable farmers in Saboti Constituency. It sought to describe how the production levels, market availability, and asset endowment of the small-scale vegetable farmers in rural Kenya affected poverty levels.

2. LITERATURE REVIEW

Introduction:

This chapter comprises of some of the literature that is available in line with the topic of study, the theoretical framework, theoretical model, conceptual framework, conceptual review, summary of literature and knowledge gap.

Theoretical Framework:

Production theory:

Cobb–Douglas production model is a particular functional form of the production function, widely used to represent the technological relationship between the amounts of two or more inputs, particularly physical capital and labor, and the amount of output that can be produced by those inputs. Sometimes the term has a more restricted meaning, requiring that the function display constant returns to scale. The Cobb-Douglas form was developed and tested against statistical evidence by Charles Cobb and Paul Douglas during 1927–1947 (Yuan, 2011). In its most standard form for production of a single good with two factors, the function is $Y = AL^{\beta} K^{\alpha}$

Where:

Y= total production (the real value of all goods produced in a year)

L = labor input (the total number of person-hours worked in a year)

K = capital input (the real value of all machinery, equipment, and buildings)

A = total factor productivity

α and β are the output elasticity of capital and labor, respectively. These values are constants determined by available technology. Output elasticity measures the responsiveness of output to a change in levels of either labor or capital used in production, ceteris paribus. For example, if $\alpha = 0.45$, a 1% increase in capital usage would lead to approximately a 0.45% increase in output.

Further, if $\alpha + \beta = 1$, the production function has constant returns to scale, meaning that doubling the usage of capital K and labor L will also double output Y. If $\alpha + \beta < 1$, returns to scale are decreasing, and if $\alpha + \beta > 1$, returns to scale are

increasing. Assuming perfect competition and $\alpha + \beta = 1$, αandβ can be shown to be capital's and labor's shares of output. Cobb and Douglas were influenced by statistical evidence that appeared to show that labor and capital shares of total output were constant over time in developed countries; they explained this by statistical fitting least-squares regression of their production function. There is now doubt over whether constancy over time exists.

In relation to this study, the production theory indicates that income is generated for those participating in production, that is, the labor force, society, and owners. The small-scale vegetable farmers have a common interest to maximize their profits. The parties that contribute to production receive increased incomes from growing and developing production. The well-being gained through commodities stems from the price-quality relations of the commodities. Due to competition and development in the market, the price-quality relations of commodities tend to improve over time. Type of well-being generation can only partially be calculated from the production data.

Transactional cost theory:

Saranga, Mukherji' & Shah (2015) define transaction cost as the cost of providing for some good or service through the market rather than having it provided from within the firm. Greenwood &Scharfstein (2013) contends that without taking into account transaction costs, it is impossible to understand properly the working of the economic system and have a sound basis for establishing economic Policy. Saranga et al., (2015) avers that in transacting, there are three key concepts of; transaction costs, asset specificity, and asymmetrical information distribution. Greenwood et al., (2013) established that in order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, conduct negotiations and to undertake the inspection needed.

Arya &Mittendorf (2013) stated that transaction costs in the form of; (a) search and information costs, (b) bargaining and decision costs, and (c) policing and enforcement costs. Equally Arya et al., (2013) argues that this can be decomposed further into four separate costs related to transacting as: (a) search costs, (b) contracting costs, (c) monitoring costs, and (d) enforcement costs. Search costs include the costs of gathering information to identify and evaluate potential trading partners.Relative to this study, small-scale farmers can form co-operatives or groups, which can be tasked to seek for information related to marketing, research on the most effective fertilizers, seeds, pesticides, and herbicides instead of every farmers engaging into such transactions that might be costly. The cost involved in advertising, contracting, negotiating prices, monitoring and marketing can be incurred by groups as opposed to individual farmers.

Resource based view theory:

Matopoulos, Barros & Van der Vorst (2015) position is that resource-based view (RBV) has since become one of the dominant contemporary approaches to the analysis of sustained competitive advantage. A central premise of the resource-based view is that firms compete based on their resources and capabilities .Srivastava et al., (2013) established that most RBV researchers choose to "look within the enterprise and down to the factor market conditions that the enterprise must contend with, to search for some possible causes of sustainable competitive advantages" holding constant all external environmental factors. Sanderson, Lonsdale, Mannion &Matharu (2015) argued that the bonding effect of relationship-specific investments based on RBV can be one of the most important determinants of buyer-supplier relationships. Galvin, Rice & Liao (2014) posit is that a firm's resource must, in addition, be valuable, rare, and imperfectly imitable and substitutable in order to be a source of a sustained competitive advantage. Duffy et al., (2015) postulated that each firm is characterized by it is own unique collection of resources of core competencies. Veerendrakumar et al., (2015) established that the source of competitive advantage is the creation and exploitation of distinctive capabilities that are difficult to build and maintain, codify, make into recipes that are hard to copy, emulate, and cannot simply be bought off the shelf. Kozlenkova, Samaha&Palmatier (2013) asserts that there are three basic distinctive capabilities; (a) corporate architecture (b) innovation (c) Reputation.This theory informs the study beneficiaries such as small-scale vegetable farmers to establish their ability in terms of farm size, and abilities (experience and knowledge) to maximize what they have in order to derive maximum returns from their resources. For instance, farmers with large farmers have the can access credit that upon investment in their farms, can give them high returns.

Adoption Theory:

Adoption theory refers to the stage in which a technology is selected for use by an individual or an organization .It can also be referred to as an innovation. Adoption theory happens when aninnovationor innovative is adopted(Arthur, 2012).Individuals or groups also define adoption as the continued use of a recommended idea or practice over a reasonable long period. Lai (2017) defined technology adoption as a decision to apply an innovation and to continue to using it. When the new technology spreads to general use and application, this is referred to as diffusion stage of the adoption theory. Integration connotes a sense of acceptance, and perhaps transparency, within the user environment. Adoption as applied to farming is when a farmer has full information about the technology and its potential (Samaradiwakara and Gunawardena, 2014).

Lai (2017) explains that a when new technology is introduced to smallholder's farmer by itself alone it does not guarantee for a wide spread of it adoption and efficient use. For efficient utilization of the technology the fulfillment of specific economic, technical, and institutional conditions are required. From the farmers' perspective, the new technology should be economically more profitable than the existing alternatives. This study was guided by adoption theory. The individual farmer's decision to incorporate commercialization of vegetable farming into his or her production process is an individual's adoption whereas the process of diffusion of a new idea within a region of study or population is the aggregate adoption. Adoption pattern to a technological change in agriculture is not uniform at the farm level. It is a complex process, which is governed by the farmers' many socio-economic factors and the farmers' degree of readinessto embrace exposure to improved practices and ideas. For example,the awareness and attitude of farmers towards adoption of improved agricultural technologies and the institutional factors, which act as incentives/disincentives to agricultural practices such as farmers' resource endowment, land holding size and labor. These factors are of considerable importance in bringing about the technological change in agriculture (Lai, 2017).

In relation to this study, adoption of commercialized vegetable farming is expected to have signaled a confidence in its potential to alleviate poverty, improve the wellbeing of the community, or more efficient in farming of vegetables by small scale farmers. This is aimed at bringing about new social and functional conditions in the area of production, marketing, and resource mobilization. Commercialized vegetable farming will achieve the objective of increased production, increased income, access to credit, access to market, high quality production and high level management practices as a means of sustainable way of improved living standard.

Conceptual Framework:

The variables of the study comprised of independent variable and dependent variables and intervening variables on the influence of commercialization of small-scale vegetable farming on poverty levels. The figure 2.1 presented a Conceptual framework for this research and provided a background understanding for contribution of commercialization of small-scale vegetable farming to poverty reduction. The framework premises were to promote commercialization of small-scale vegetable farming as a tool for poverty reduction. Thus in this study commercialization of small scale vegetable farming was thought to be best fit for poverty reduction if it targeted the live hoods for the poor through: Access to: Productive assets; Financial resource; Education (as indicated by children school enrolment); and Basic needs (food, health service, shelters, clothing, security).

In Kenya, agriculture is the backbone of the economy and it is mainly concentrated in the rural areas, poverty is dominantly rural with about 49.1% of rural Kenyan population living below poverty line (Wajiha and Bushra, 2015). Empirical studies on small-scale vegetable farming and how it has influenced rural poverty based on asset-poverty measurements are nonexistent. In the light of this the argument that horticultural farming provides pro-poor strategy development, estimation of medium-term or long term livelihood impacts of commercialization of smallholder horticultural farming is of policy relevance. Commercialization of small-scale farming of vegetables was seen as a poor development strategy in Trans Nzoia County Kenya if we take into consideration the low emphasis it was given in the Trans Nzoia County integrated development plan (CIDP) 2013 -2017. Whereas vegetable farming seems to be more successful in economic terms at macro level, the extent to which these economic gains derived from commercialization of vegetables impact on the poor at the household level in the long run has not been clearly understood.

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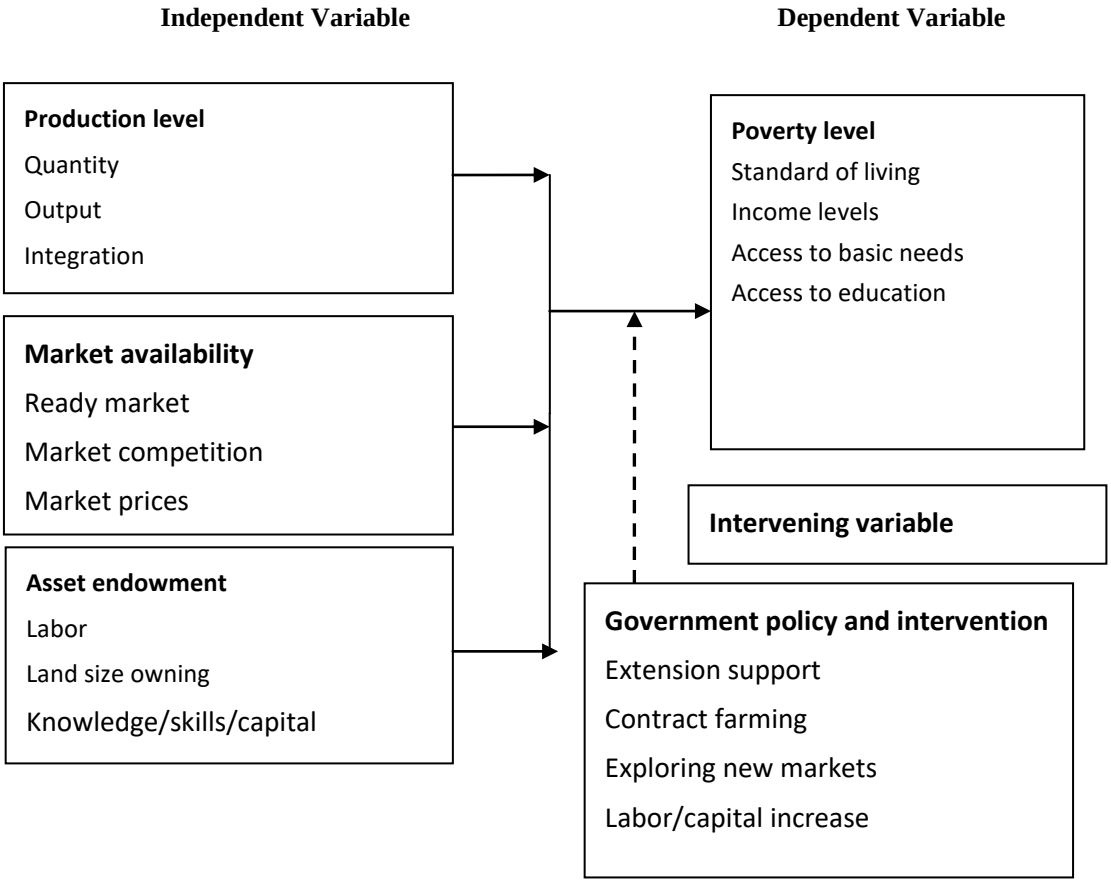

Figure 2.1: Conceptual Framework

Review of variables:

This framework analyses the following independent variables,that is production level, market availability, asset endowment and the moderating variable of Government policy interventions and the linkage of these variables have to the dependent variable ,that is, poverty levels of small-scale vegetable farmer in Saboti constituency.

Production Levels by Small Scale Vegetable Farmers:

Production is often influenced by many factors of which commerce is one of them. When people achieve high productivity in their endeavors, they start to learn the new norms for exchanging their products for maximum profits. In order to achieve this, people have to integrate their products with other stakeholders in trading. Wagle (2016) applied a Cobb Douglas production function to quantify the contribution of various factors in agricultural production in Nepal. It was found that variables such as family size, use of fertilizer and interaction of variety with pesticide sprays were highly significant towards muskmelon production. Relative to this study, the study by Wagle (2016) did not consider other factors influencing commercialization of vegetable farming, it only considered how inputs influence output and hence commercialization. Emana, Dinssa and Afari-Sefa (2015) also quantified the contribution of various factors in agricultural production using the quadratic production function. The results showed that the amount of seed, fertilizer, and the frequency of irrigation were significantly contributing in production to a certain level as the coefficient in squared terms was negative. This indicated that using the mentioned inputs above a certain level could have a negative effect on productivity. In a research carried out on the pineapples production by Yusi (2016), it was concluded that reducing inputs saves costs, but reduces productivity. Like the study by Wagle (2016), studies by Emana, Dinssa and Afari-Sefa (2015) and Yusi (2016) also failed to consider factors such as asset endowment, access to credit, production capacity, information, size of land and available marketing, which this study considered in relation to how they influence commercialization of vegetable farming.

Gebre-ab (2006) in his paper that aimed at assessing the influence of small-scale agriculture on livelihoods in Ethiopia argued that there are risk dynamics associated with production in the agriculture sector in terms of decision making which can jeopardize a country's food security hence the poverty levels. These dynamic included crop and livestock losses, which influence highly on loss of income hence affecting the poverty levels of a farmer. In his paper he recommended that the Ethiopian government and its development partners should purpose to enhance resilience and response to natural disasters by implementation of a holistic and systematic risk management system which will reduce the vulnerability and strengthen the resiliency of the country's agricultural supply chain and the livelihood that depends on them.

Jumbam and Betek, (2014) Contract farming can be the engine to reduce poverty by providing market opportunities for farmers. Contract farming is a type of integration that can bring farmers to a dynamic market and stimulate the agricultural products to globalization. Many Governments, NGOs and other international organization, have promoted it in the recent four decades in developing countries. The study by Jumbam and Betek, (2014) considered contract farming, which is rarely accessible and practical among small-scale farmers in Saboti Constituency who have small farm sizes. This study seeks to establish ways through which farmers with small farm sizes can use them in eradicating poverty by increasing production and exploring other markets in order to maximize their returns

Marketing Availability for Small Scale Vegetable Farmers:

Marketing availability is an important factor for every commercial enterprise and for Small Scale Vegetable Farmers to go commercial they need to be able to identify the market for their inputs and outputs. Matsane and Oyekale (2014) argues that access to market is an essential requirement for the poor rural communities and they also have to enjoy the benefits of agricultural growth hence participation of small holder famers in accessing markets is invaluable. According to Heinmen (2010), the reason why most rural communities cannot improve their living standards is that they face difficulties in accessing markets. A major reason why even those farmers who can produce surpluses remain trapped in poverty cycle is lack of access to profitable markets and more often those farmers are forced to sell their produce to the buyer at whatever price dictates. Market environment includes factors such as credit availability, costs of production processes, market information and inadequate understanding of important factors that influence these processes (Matsane and Oyekale, 2014)

Private sector improvement is very effective in linking farmers to the dynamic trading process, but farmers themselves also must prepare to act proactively in selling their output (Berdegué et al., 2008). Matsane, and Oyekale (2014) reported that insufficient knowledge in product sorting, grading, packing, and traditional transportation affect the quality of produce marketing. Common market integration such as Cooperative and Contract farming sometimes can bring helps to farmers by build a strong commerce by reducing the risks. Parties try to connect with each other to get benefits from their integration. Farmers' communities or organizations can also be important in linking farmers to dynamic markets. Small scale and not-to-standard products are challenges for farmers in the integration with other entrepreneurs. So, farmers themselves must organize communities or cooperatives within their location to produce homogenous or heterogeneous products required to meet the needs of a specific entrepreneur such as agro-processing, hotels or restaurants (Emana, Dinssa, and Afari-Sefa, 2015).However, contract farming has some threats for farmers, for example, the buyer can break the contract with farmers, or the farmers may be unable to achieve the market's high product quality requirements but at the end contract farming cushions farmers against fluctuating market prices and these integrations provides some assurance to the farmers in terms of market availability.

Poet and Obi (2007) investigated factors such as equipment, in-formation, market distance, assets value, infrastructure, total income, extension assistance, and farming type. According to Lauw et al.(2007), small holder farmers were excluded from main street food markets in South Africa as a result of colonial legacy and due to the poor performance of the their production. Smallholder farmers' production was characterized by high production and transaction cost and poor quality making them less competitive. Lack of assets, market information, and access to services are some of the factors that hinder small holder famers from entering the potentially lucrative markets.

Poet and Obi (2007), in their study of technical constraints to smallholder farmers and their implications for market access, collected data based on the equipment used by small scale farmers, access to market information, market distance, asset values and the demographic and socio economic variables, concluded that access to information, total asset

ownership, income and extension and farming type are the most important factors that influence market access by small scale farmers. Road conditions to the public stores, road conditions to the local fresh produce market, road conditions to family and friends, distance to the output market, percent of the produce to the market were some of the factors that affected small scale farmers in accessing markets. In Kenya, root crops and vegetables are sold at various farm gates, designated urban centers markets, supermarkets, and open markets along the Kenyan highways. These sales constitute a major source of the small-scale farmers' incomes. Therefore, the small-scale horticultural farming is substantially critical in enhancing rural incomes in the country. Small-scale farming in Kenya has potential to grow if there is adequate information on market and capital availability, leading to good timing of crop production, reduce cost of production reliable storage facilities. All these will in-turn affect the economic livelihood of these growers in terms of incomes.

Asset Endowment for Small Scale Vegetable Farmers:

Asset endowment refers to households' access to assets which including land, labor, knowledge, technology and finance. Asset endowment has a significant and a very important factor that influences household's livelihood decision making. In a study conducted by Wajiha and Bushra (2015) in Pakistan on small-scale farmers who engaged in vegetable farming and noted that, farmers used such assets to invest in their production or business to achieve welfare benefits. Drawing on a survey done by Muriithi and Matz (2014) in Kenya, the authors noted that farmers are endowed differently and that the rich and the poor had various livelihood strategies relative to their socio-economic status. The rich households had more hired adult laborers, access to credit, and social network were generally more flexible in their income generation than those households with less asset endowments. With access to finances and technology farmers are able to change their seasonal cropping patterns ,for example, the use of irrigation and greenhouses to control period of production in line with the market needs. Availability of labor in a labor-intensive production and equipment in a mechanized production will help in effective and efficient production of crops, which will generate high income. Education is also a factor in decision making as far as production and trading is concerned. When farmers have knowledge of available markets, potential new markets and modern ways of production for their vegetable this will improve trading in terms of varieties, qualities and quantities. Nahanga, and Becvarova (2016) mentioned the varied sources of acquiring finances for farming as savings, gifts and inheritance, outside equity capital, leasing, contract production and borrowing. The authors added that inadequate cash and credit opportunities limit the possibility to substitute inputs for example herbicides for labor-intensive tasks. In the comparison between vegetable farming and rice stated that lack of long term low interest credit is a major constrain to vegetable production, than for those producing rice hence more emphasis needs to be given to vegetable farmers. In his studies on vegetable production in Ghana, Samaradiwakara and Gunawardena (2014) reported that commercial vegetable production was quite labor intensive and that many farmers relied on family labor mainly and hired labor to supplement their own family labor. Knowledge and technology affects farmers' decision-making. With knowledge of what markets are available farmers may change their perception from selling only to intermediaries who control the price, to selling to other market actors providing higher profits to them (Wajiha and Bushra, 2015).

Poverty Levels among Small Scale Vegetable Farmers:

According to Sanida, Asafu-Adjaye and Mahadevan (2016), the reason why most rural communities cannot improve their living standards is due to the fact that they face difficulties in accessing markets. Poor access include obtain agricultural inputs, and access to consumers, that is, access to profitable markets. Market access is determined by factors such as credit availability, product availability, attributes, prices, efficiency, costs of these processes and market information. Poor access to markets is a major problem in poor rural communities (Matsane and Oyekale, 2014). Reardon (2005) argues that access to market is an essential requirement for the poor rural communities and they also have to enjoy the benefits of agricultural growth hence participation of smallholder famers in accessing markets is invaluable. According to Cervantes-Godoy and Dewbre (2010), producing for the market requires resources such as land, water, labor force, finances, improved technology, and good management. Poor access to these resources affects the way in which small-scale farmers can benefit from opportunities in agricultural markets, especially in terms of variety, quality, and quantity of products traded. One of the major causes of high levels of poverty among small-scale farmers is low producer prices and high input costs (Cervantes-Godoy and Dewbre, 2010). Marketing contributes to the improvement of small-scale farmers' livelihoods which leads to poverty reduction.

Critique of Existing Literature:

Literature reviewed on production levels by small-scale vegetable farmers indicate that the production levels were affected by family size, use of fertilizer and interaction of variety with pesticide sprays were highly significant towards muskmelon production (Wagle, 2016). The studies showed that the amount of seed, fertilizer, and the frequency of irrigation were significantly contributing in production to a certain level as the coefficient in squared terms was negative. Despite this literature in the production of vegetables is scanty with most studies based on different crops such as research carried out on the Fiji Sugar Industry by Reddy (2008) which concluded that reducing inputs saves costs, but reduces productivity. The study found that land quality, labor, fertilizer, herbicides and machinery influence productivity. These studies shed light on production levels but the findings are not specific to the farming of vegetables and therefore not very authoritative in the field requiring studies to be conducted in this field to shed more clear light.

Literature reviewed on marketing availability for small-scale vegetable farmers illustrates how insufficient knowledge in product sorting, grading, packing, and traditional transportation affect the quality of produce marketing (Matsane, and Oyekale, 2014). The studies illustrate that the common market integration such as Cooperative and Contract farming sometimes can bring helps to farmers by building a strong commerce by reducing the risks. Parties try to connect with each other to get benefits from their integration. Farmers' communities or organizations can also be important in linking farmers to dynamic markets.

Small scale and not-to-standard products are challenges for farmers in the integration with other entrepreneurs. Therefore, farmers themselves must organize communities or cooperatives within their location to produce homogenous or heterogeneous products required to meet the needs of a specific entrepreneur such as agro-processing, hotels, or restaurants (Emana, Dinssa, and Afari-Sefa, 2015).

On asset endowment for small scale vegetable Farmers a survey done in China Yuan, (2011) indicated that rich households, had more hired adult laborers, access to credit, and social network were generally more flexible in their income generation than those households with less asset endowments. With access to finances and technology farmers are able to change their seasonal cropping patterns ,for example, the use of use irrigation and greenhouses to control period of production in line with the market needs. Availability of labor in a labor-intensive production and equipment in a mechanized production will help in effective and efficient production of crops which will generate high income. Education is also a factor in decision making as far as production and trading is concerned. When farmers have knowledge of available markets, potential new markets and modern ways of production for their vegetable this will improve trading in terms of varieties, qualities and quantities.

Small-scale vegetables farmers are not privy to this information. Lack of this information therefore puts them at a disadvantage (Sanida, Asafu-Adjaye and Mahadevan, 2016).On poverty levels among small scale, vegetable farmers the studies reviewed indicate that the reason why most rural communities cannot improve their living standards is because they face difficulties in accessing markets. Poor access include obtain agricultural inputs, and access to consumers, that is, access to profitable markets. Matsane and Oyekale (2014) noted that poor access to markets is a major problem in poor rural communities. The authors argue that access to market is an essential requirement for the poor rural communities and they also have to enjoy the benefits of agricultural growth hence participation of smallholder famers in accessing markets is invaluable. These studies have however not provided insight on what these farmers can do in order to fight against the poverty levels they face which is a hindrance to their performance, there is need therefore for studies to be conducted that will yield information on how these groups of individuals can fight against the poverty and improve their performance.

Research gap:

Vegetable commercialization of smallholder farming in Kenya can achieve its objectives and bring about the required benefits to the poor and rural based households when certain factors influencing its potential success or those that affect a farm household's decision to participate in the market are put in place. Few studies appear to have focused specifically on the effects of commercialization of vegetables on poverty levels in Kenya. Mwangi, Webo, Roothaert, Muhanji (2011) show that farmers in Kenya have very low proportions of vegetable output marketed. Evidence on Kenya rural farm sizes shrink is a good indicator of why farmer need to consider short session crops if they desire to increase their returns. Thus, there appear to be divergent trends on the demand and supply, demand trends, which may be creating greater opportunities for staple foods in domestic markets and supply trends, which suggest an interest of farmers to diversify away from lower value staple food crops.

Summary:

Variables such as family size, use of fertilizer and interaction of variety with pesticide sprays were highly significant towards muskmelon production. The amount of seed, fertilizer, and the frequency of irrigation are significant contributors in production to a certain level as the coefficient in squared terms was negative. Using these inputs a certain level could have a negative effect on productivity. The quality of land quality, labour, fertilizer, herbicides and machinery influence productivity (Wagle, 2016). According to Cervantes-Godoy and Dewbre (2010) where agriculture is the predominant occupation, the means of livelihood will be dependent not only on the fertility and the ease of putting land into productive use but also on the allocation of rights in land and the marketing and sharing of its produce. FAO (2008) also stated that the use of land varies not only according to ecological or physical factors-which may limit what can be grown- but also according to the tenure arrangements. The availability of water, utilization of technology are great determinants of production in agriculture (Arthur, 2012). Production levels also face risks that can jeopardize a country's food security. In marketing there is insufficient knowledge in product sorting, grading, packing, and traditional transportation affect the quality of produce marketing. Common market integration such as Cooperative and Contract farming sometimes can bring help to farmers by enhancing business activities and reducing risks. Parties try to connect with each other to get benefits from their integration. Farmers' communities or organizations can also be important in linking farmers to dynamic markets. Small scale and not-to-standard products are challenges for farmers in the integration with other entrepreneurs. So, farmers themselves must organize the communities or cooperatives within their location to produce homogenous or heterogeneous products required to meet the needs of a specific entrepreneur such as agro-processing, hotels or restaurants (Emana, Dinssa, and Afari-Sefa, 2015).

The rich households, had more hired adult laborers, access to credit, and social network were generally more flexible in their income generation than those households with less asset endowments. With access to finances and technology farmers are able to change their seasonal cropping patterns ,for example, the use of use irrigation and greenhouses to control period of production in line with the market needs. Availability of labor in a labour intensive production and equipment in a mechanized production will help in effective and efficient production of crops which will generate high income. Education is also a factor in decision making as far as production and trading is concerned. When farmers have knowledge of available markets, potential new markets and modern ways of production for their vegetable this will improve trading in terms of varieties, qualities and quantities. There is therefore need for information to be provided for the small scale farmers who are not richly endowed with the resources required to improve their production.

According to Sanida, Asafu-Adjaye, and Mahadevan (2016), the reason why most rural communities cannot improve their living standards is because they face difficulties in accessing markets. Poor access include obtain agricultural inputs, and access to consumers, that is, access to profitable markets. Market access is determined by factors such as credit availability, product availability, attributes, prices, efficiency, costs of these processes and market information. There is therefore need to provide information for small scale vegetables farmers who are in most occasions located in the rural areas on how they can improve their production and fight the poverty they face.

3. RESEARCH METHODOLOGY

Introduction:

This chapter deals with research design, target population, sampling method, data collection method, validity tests for instrument used, and analytical techniques used.

Research Design:

The study employed a descriptive survey research design. Descriptive survey research design was used to gather, summarize, present and interpret information for the purpose of clarification (Orodho, 2008). This research design was particularly appropriate since the study aimed at collecting original information from a population that was too large to be observed directly. Questionnaires were administered to gather information from small-scale farmers.

Target Population:

Saboti Constituency is one of the five electoral constituencies in Trans-Nzoia County and is in the Upper Highland agro-ecological zone. It lies between altitude 2,400 and 4,313 metres above sea level. It covers an area of 323.6 square

kilometers, with five administrative wards, that is, Kinyoro; Matisi; Tuwani; Saboti and Machewa (IEBC Trans Nzoia, 2013). The Constituency has a total population of 166,482 (Kenya National Bureau of Statistics, 2009) and it is projected to have a total population of 223,830 by 2017(Trans Nzoia CIDP 2013-2017).Saboti Constituency has gentle undulations rising steadily towards Mt. Elgon in the Northwest. It is well known for its rich soils and favourable climatic conditions, which posts a large potential for agricultural activities. The target population included mainly small-scale vegetable farmers in Saboti Constituency. According to the department of Agriculture county government of Tran Nzoia the estimated total numbers of small-scale vegetable farmers in the Saboti constituency was about 1,500, so this was the target population of the study as depicted in the table below.

Table 3.1: Target population

Market place	Number of small scale vegetable farmers
Kinyoro	43
Kitalale	57
Kipsongo	75
Kisawai	81
Bondeni	97
Machewa	85
Masaba	89
Matisi	103
Mitume	76
Tuwani	67
Lukhome	82
Chemchemi	79
Gitwamba	101
Saboti	121
Muthoni	91
Koikoi	87
Virunda	77
Rafiki	89
Total	1500

Sampling Frame:

The sampling frame was small scale vegetable farmers in Saboti constituency. The respondents were the head of each family.

Sample Size and Sampling Technique:

The sample size considered the major part of all statistical analysis. The computation of the appropriate sample size generally considered the most important and the most difficult step in statistical study. The sample size plays a crucial role in those cases of statistical studies where the statistical studies like sample survey, experiments, observational studies, and others were involved (Kothari and Gaurav, 2014).The sample size for this study were obtained using Mora&Kloet2010) formula for finite population as follows;

$$n = \frac{N}{\left(1 + Ne^2\right)}$$

Where,

n = the sample size

N = the size of population

e= the error of 5 percentage points

$$n = \frac{1500}{\left(1 + 1500 \times 0.05^2\right)} = 316$$

To select the farmers in each village, the researcher employed simple random sampling. This technique was adopted to allow each respondent an equal chance to take part in the study.

Table 3.2: sample size and sampling frame

Village	Number of respondents small scale vegetable farmers
Kinyoro	9
Kitalale	12
Kipsongo	16
Kisawai	17
Bondeni	20
Machewa	18
Masaba	19
Matisi	22
Mitume	16
Tuwani	14
Lukhome	17
Chemchemi	17
Gitwamba	21
Saboti	26
Muthoni	19
Koikoi	18
Virunda	16
Rafiki	19
Total	316

Data collection Methods:

Data was collected from small-scale vegetable farmers. Structured questionnaires were administered to farmers who then responded to the questions and returned to the researcher. This method of data collection ensured the collection of quantitative data and qualitative data that involves views, opinions, and ideas from respondents about the topic of study.

Questionnaires:

A questionnaire is used to determine a variety of aspects from respondents including beliefs, thoughts, knowledge, and motives (Mugenda & Mugenda, 2009). To achieve the objectives of the study, the researcher used questionnaires as the main tool for collecting the primary data from the respondents. The questionnaires were physically distributed randomly to farmers. Structured questionnaires were used to collect the required information from the study population. The questionnaires were divided into two sections; the first section covered the background information of the respondents while the second section covered the objectives of the study. This method was chosen because it enabled the researcher to obtain a lot of information in a small space of time. The instrument also ensured anonymity of respondents as their identities were not requested for. The questionnaires had questions divided into variables of the study, with the Likert scale used with respondents answering the questions in each variables based on a strength of 1 to 5 where 1 is "Strongly Disagree", 2 is " Disagree", 3 is "Neutral", 4 is "Agree", and 5 is "Strongly Agree". Questionnaires were mainly issued to the small-scale farmers.

Pilot Test:

A pilot test is a scholarly test to show evidence for accuracy, generalizability, and reliability Kothari and Gaurav (2014) hence the researcher established the attributes of a scholarly study by testing the research instrument. The questionnaires were administered to a few small-scale vegetable farmers before the researcher proceeded to the field to collect data. This was done to determine whether the instruments had any problem like ambiguity, appropriate language and they were comprehendible. It was good check that the instruments brought out the main objective clearly. The results of the pilot test were tested for reliability using Cronbach's coefficient Alpha formula to obtain the "the coefficient of reliability." Whenever the coefficient of reliability is 0.80 or more then the test is said to be yielding high degree of reliable data (Mugenda and mugenda, 2009). Reliability is the measure or the degree to which a research instrument yields same results after repeated trials. It may also mean consistency of the research instrument over time (Mugenda and Mugenda 2009).

Validity of Research Instrument:

Validity is the determination of whether what the research instrument measured is what it was intended to measure (Mugenda and Mugenda 2009). Face validity was ensured by: pretesting of the data collection tool and scrutiny of the instrument by the research supervisor. Content validity was ensured by doing a thorough literature review study on which the content of the questionnaire were based. The validity of research instrument was based on experts' opinion.

Reliability of Research instrument:

Rapp (2012) posits that internal consistency of a set of measurement items refers to the degree to which the items are homogeneous and can be estimated using a reliability coefficient such as Cronbach's alpha. Cronbach's alpha correlates each item with each other item, and the total score. Items with weaker correlations or low scores can be removed to leave an instrument with a high degree of homogeneity. Based on this, an internal consistency analysis was performed for each statement corresponding to each of the identified poverty related constructs and the various values of Cronbach's alpha for each construct of which a reliability co-efficient of 0.9 is excellent, 0.80 and above is considered good, 0.7 and above is acceptable, 0.6 and above is poor, and 0.5 above and below is unacceptable.

Data Processing and analysis:

After obtaining research permit from the national council for science and technology the researcher proceeded to collect data. The analysis of data went through a number of closely related operations namely establishment of categories, application of these categories to raw data through coding, tabulation and drawing of statistical inferences. Editing was done to detect errors and omissions thus ensuring that the data was accurate, consistent with other facts gathered, uniformly entered, as complete as possible and arranged.

To facilitate and improve the quality of the data for coding and tabulation the researcher read through and corrected any topographical errors resulting from respondents who were not too careful when responding. Coding was done to help transform categories of data into symbols that were tabulated and counted. Tabulation procedure, which was a technical application, was used to put classified data into tables. The study adopted both the qualitative and quantitative analysis in order to achieve the objective of the study. The researcher used descriptive statistics presented in tables as percentage and frequencies.

According to cooper, (2006) qualitative research includes an array of interpretive techniques, which seek to describe, decode, and translate. It seeks to develop understanding through a detailed description. Kothari and Gaurav (2014) asserts that interpretive research is qualitative seeking to unearth collective frames of reference, or construed realities that guide the attribution of meaning and help account for how respondents create, enact, and interpreted the reality

they inhabit. It assisted in answering the three research objectives in the interview schedules. For quantitative techniques, inferential statistics were applied to test the three statistical hypotheses, in drawing conclusions and, in some cases, making predictions about the properties of a population based on information obtained from a sample. Inferential statistics were used to answer cause-and-effect questions, make predictions and investigate differences between and among groups. However, inferential statistics by themselves did not prove causality, thus such proof was always a function of a given theory, and it was vital that such theory be clearly stated prior to using inferential statistics.

Multiple regression analysis technique was used to determine the effect of independent variables on the dependent variable, it was used to measures the relative influence of each independent variable based on its covariance dependent variable and was useful in forecasting. It was most appropriate when both the independent and dependent variables are interval, though some social scientists also use regression on ordinal data. Like correlation, regression analysis assumes that the relationship between variables is linear. In its simplest form multiple regression analysis involved finding the best straight-line relationship to explain how the variation in an outcome (or dependent) variable, Y, depends on the variation in a predictor (or independent) variable, X. Once the relationship is estimated, it is possible to use the equation:

The following model used:

$$Y_i = \beta_O + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu_i$$

Where;

(a) Dependent variable is Poverty Eradication and is denoted by Y

(b) Independent variables are:

X_1 Production levels

X_2 Market availability

X_3 Asset endowment

β_0 Constant term

β_j Beta coefficients for $j = 1,2,3$ which indicate per unit change in the dependent as the independent variable changes by one unit.

μ_i Error term for $i = 1,2,3...n$

However, the presence of a moderating variable was measured through adding Z as a Moderating variable on the model that regress on each of the five variables.

$$Y_i = \beta_O + \beta_1 X_1 Z + \beta_2 X_2 Z + \beta_3 X_3 Z + \mu_i$$

4. RESEARCH FINDINGS AND DISCUSSIONS

Introduction:

The chapter deals with presentation of demographic characteristics and responses to research questions, a detailed analysis of inferential statistics including multivariate regression, correlation, and reliability test. The chapter also gives an analysis of descriptive statistics and a detailed analysis elucidating the presented results.

Response rate:

According to the sample size adopted for this study, which was 316 based on the results given by the finite population sample size determination formula, 316 questionnaires were distributed to respondents and all were successfully responded to and from this it can be deduced that the response rate was 100%.

Demographic characteristics of respondents:

This section gives a summary of the distribution of respondents based on the demographic characteristics. Categorically, the section looked at gender of respondents, which was important especially with regard to the establishment of the specific group/gender that contributes majorly to the production, marketing and asset endowment from small-scale vegetable farming. Apart from that, this section focused on age bracket of respondents to highlight the specific group in terms of age and their respective input in terms of production, marketing and asset endowment from small-scale of vegetable farming. The area of vegetable grown was important in that it gave a reflection of how much production and hence marketing related to individual piece of land with regard to size.The period within which the small-scale farmer had grown vegetable also formed part of this section because it showed how experienced small-scale farmers were, which again reflected on production and marketing methods, which are cost effective and hence profitable.

Table 4.1: Distribution of respondents by gender, age bracket, area of vegetable grown and period grown vegetable

Characteristics	Frequency	Percentage
Gender		
Male	55	17.4
Female	261	82.6
TOTAL	**316**	**100**
Age Bracket		
18-25 years	51	16.1
25-30 years	83	26.3

30-35 years	65	20.6
35-40 years	59	18.7
Over 40 years	58	18.4
TOTAL	**316**	**100**
Area of vegetable grown		
Less than 0.25 hectares	240	75.9
0.26-0.50 hectares	36	11.4
0.51-0.75hectares	3	0.9
Over 1 hectare	37	11.7
TOTAL	**316**	**100**
Period grown vegetable		
0-5years	137	43.4
5-10years	95	30.1
10-15years	44	13.9
15-20 years	25	7.9
Over 20 years	15	4.7
TOTAL	**316**	**100**

In table 4.1, it is clearly indicated that more female than male, were involved in the production and marketing of vegetable from small-scale farming; this could be an indication of the amount of time female respondents had to attend to small-scale farms. Out of 316 respondents that took part in the study, the age bracket of 25-30 years was the highest frequency. Accordingly, this is an indication that this age bracket is strong and productive and has a high demand to satisfy their basic needs; hence, will always create time and engage in vegetable farming and marketing from small-scale farms. On the other hand, it is vividly clear from table 4.1 that respondents within the age bracket of 18-25 years and those above 40 years were lowly involved in vegetable production and marketing. The rationale behind it is that respondents within the younger age brackets are in school and most likely they have not be allocated any land to be able to engage in vegetable farming. In the same table 4.1, out of 316 respondents, 240 engaged in vegetable farming in small-scale farms whose size was less than 0.25 hectares, this shows that averagely 75% of farmers who take part in vegetable farming are small-scale, and the proportion of land they use on vegetable farming is considerably small. It is also clear from the table that the majority of respondents 137 out of 316 have less than 5 years' experience in small-scale vegetable farming; an indication that their methods of production and marketing and not well-enhanced because they might not understand the trends, cycles and challenges and how to overcome them.

Table 4.2: Percentage of vegetable grown for home consumption and for sale

	Home		Sale		
Percentage of vegetable grown	F	%	F	%	
Less than 20%	118	37.3	35	11.1	
20-40%	68	21.5	24	7.6	
40-60%	19	6.0	31	9.8	
60-80%	29	9.2	54	17.1	
Over 80%	79	25.0	115	36.4	
Missing	3	0.9	57	18.0	
Total	**316**	**100**	**316**	**100**	

In table 4.2, it is indicated that, less than 20% of the respondents grew vegetable for home consumption while over 80% grew vegetables in small-scale farms for sale. This was the highest percentages within which vegetable was grown for consumption than for sale. It shows that the majority of small-scale farmers produce vegetables majorly for consumption at home.

Table 4.3: Where vegetables are sold

	Gate		Rural centre		Kitale main market			Others		
Where vegetables are sold	F	%	F	%	F	%		F	%	
Less than 20%	9	2.8	12	3.8	7	2.2		5	1.6	
20-40%	15	4.7	6	1.9	6	1.9		3	0.9	

40-60%	13	4.1	22	7.0	3	0.9		3	0.9	
60-80%	22	7.0	16	5.1	10	3.2		5	1.6	
Over 80%	53	16.8	38	12.0	37	11.7		18	5.7	
Missing	204	64.6	222	70.3	253	80.1		282	89.2	
Total	**316**	**100**	**316**	**100**	**316**	**100**		**316**	**100**	

From table 4.3, it is clearly shown that 53, 38, 37 and 18 respondents all of which represent over 80% sell their vegetable at the farm gate, rural centre, Kitale main market and other places of sell respectively. This is an indication that the majority of small-scale farmers reduce their cost of production and marketing by prioritizing the sale of vegetable at the farm gate and then other places follow.

Table 4.4: Whether the respondents used interested people to help in production and marketing of vegetables

	Frequency	Percent
Yes	172	54.4
No	144	45.6
Total	**316**	**100.0**

In table 4.4, it is shown that on average some respondents call on other people to help them in production and marketing of vegetables. Out of 316 respondents, 172 sought help from interest people, while 144 did not seek help from interested people in the production and marketing of vegetables. This could indicate that the ability and capacity to seek help depended on the seasons of farming which could either be during ploughing or planting, which are labor-intensive activities in vegetable farming.

Markets and marketing channels for small-scale vegetable farming:

This section focuses on market behavior, characteristics, and marketing channels that impact on the production and marketing of vegetables small-scale farmers. The section indicates the extent to which respondents agree or disagree with given statements.

Table 4.5: Markets and marketing channels for small-scale vegetable farmers

Statement	**SA**		**A**		**UD**		**D**		**SD**		**Missing**	
	F	%	F	%	F	%	F	%	F	%	F	%
There is ready market for vegetables	68	21.5	159	50.3	6	1.9	66	20.9	13	4.1	4	1.3
The production satisfies demand	24	7.6	125	39.6	33	10.4	101	32.0	31	9.8	2	0.6
Market prices are competitive for all	35	11.1	126	39.9	25	7.9	92	29.1	36	11.4	2	0.6
There is information on available markets	32	10.1	99	31.3	18	5.7	113	35.8	50	15.8	4	1.3

From table 4.5, out of 316 respondents 159 respondents agreed that there was ready market for the vegetables they produced. In addition, 68 respondents strongly agreed that there was ready market for vegetables produced in their small-scale farms. In another case, 66 respondents confirmed by disagreeing that there was ready market for vegetables produced in their small-scale farms. Out of 316 farmers a few small-scale farmers (13) who strongly disagreed that there is ready market for vegetables. On the other hand, 125 respondents agree that production satisfies demand, while 101 respondents disagree that production satisfies demand.

In the same table, 126 respondents agreed that market prices are competitive for all, while 92 disagreed that market prices are competitive for all the producers. On average, the proportion of small-scale farmers who agreed that market prices were competitive for all surpassed the proportion of small-scale farmers who disagreed on the same. With regard to information on available markets, 113 respondents strongly disagreed that they have information on available markets because they usually sell their produce at the farm gates hence, do not move to the market where they can readily access information. While that was so, 50 respondents strongly disagreed that they accessed information on available markets. However, as that is so, 99 respondents out of 316 who took part in the study agreed that they had information on available markets. These findings are the same as those by Matsane and Oyekale (2014) indicated that small-scale farmers that explore other marketing options benefit from high prices, and real time information, which helps them in improving their socio-economic status.

Table 4.6: Regression result

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	41.752	4	10.438	6.461	.000[a]
	Residual	463.683	287	1.616		
	Total	505.435	291			
a. Predictors: (Constant), vegetable farming provided basic needs, there is ready market for produce, production for commercial purposes only, returns from produce is high						
b. Dependent Variable: estimated level of income per month						

Table 4.7: Model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.287[a]	.083	.070	1.271
a. Predictors: (Constant), vegetable farming provided basic needs, there is ready market for produce, production for commercial purposes only, returns from produce is high				

Discussion of major result:

Full exploitation of available and potential markets relates to ability of producers to sell readily, produce enough that could meet market demand, have competitive market prices for all, and have perfect information of the market. Out of 316, 68 respondents strongly agreed that there was ready market for vegetables produced in their small-scale farms . From the study, it was true that the majority of small-scale farmers were located close to the markets or in accessible places where buyers could reach them easily, these farmers enhanced, the commercialization of vegetable farming hence reduced the level of poverty amongst them. To support the same fact above, 159 respondents agreed that there was ready market for their produce; ready market could mean that these groups of farmers produced high quality vegetables because of the need to maximize their returns and embrace the practice of commercialization.

Small-scale farmers who accessed ready market for their produce greatly reduced the level of poverty and hence improved their living standards because they incurred low or no cost in transportation, there was also a possibility that farmers who were situated close to the market could increase their level of productivity as market demand increased after they explored new markets. Some of the farmers especially those who did not embrace the practice of commercializing vegetable production and marketing could be situated away from the market thereby hindering them from accessing ready markets. This was evident by 66 respondents who confirmed by disagreeing that there was ready market for vegetables produced in their small-scale farms . It was true that the farmers who were located away from the markets had low standards of living (increased poverty levels) because they relied on low demand markets, which was not reliable and consistent; thereby, discouraging the commercialization of vegetable production and marketing.

From the study, the majority of farmers sold their vegetables from the farm gate hence most of them had no information about the market . This was evident by 113 respondents who strongly disagreed that they had information on other available markets. Out of 316 respondents, 50 respondents strongly disagreed that they accessed information on available markets; the reason behind it could be attributed to the fact that some farmers were either young or elderly and could not own communication devices such as mobile phones, television sets, radios among others; hence an indication that the move impacts greatly on poverty levels. Furthermore, failure to have good communication with buyers and other producers' hindered small-scale farmers from accessing information regarding markets thereby sold their produce at low prices relative to the prevailing market prices. Farmers who agreed that they had information about the market (99 respondents out of 316 who took part in the study) could be farmers who sold their produce in the rural center through their buyers who guaranteed them continuous purchase; thereby, discouraged them from seeking alternative distribution of their produce.

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of major findings

Markets and marketing channel

Out of 316, 159 respondents agreed that there was ready market for the vegetables they produced, while 126 respondents agreed that market prices are competitive for all. The rationale behind competitiveness in market prices was that demand was high, while supply was low especially during the dry season. The fact that 129 respondents agreed that returns from investment were high was attributed to high level of experience, engagement of other people in production and marketing, all of which increased productivity and hence returns from investment.

Conclusion based on objective:

Markets and marketing channels:

Small-scale farmers did not take advantage of the available ready market to increase their production and hence marketing of vegetables because most of them were inexperienced in production and marketing. The inexperience of small-scale farmers could be attributed to adoption of common and/or outdated farming and marketing practices of vegetables, which makes them to remain in the same socio-economic status for a significant period.

Recommendations based on the study:

As that is not enough, most of the small-scale farmers ought to adopt the culture of exploring new markets such as rural market centres, Kitale Main market and others, which may offer better prices. Categorically, forming marketing co-operative societies will help them sell their produce at better prices and avoid intermediaries who exploit.

Recommendations for further research:

From the findings, it is evident that the majority small-scale farmers suffer the challenges related to inexperience, poor farming practices and failure of the government to support their practice. It is therefore recommended that more research ought to be undertaken on ways of alleviating the challenges suffered by small-scale vegetable farmers to enhance production and marketing of their produce.

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