

**EFFECTS OF THE INCREASE OF SUPERMARKETS ON  
VEGETABLE SUPPLY SYSTEMS OF SMALL-SCALE  
FARMERS IN KENYA**

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**Effects of the Increase of Supermarkets on Vegetable Supply Systems of Small-Scale  
Farmers in Kenya**

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**DECLARATION**

This dissertation is my original work and has not been presented for a degree in any other university. The work of others used in this study has been duly acknowledged.

Signature í í í í í í í í í .í í í ..      Dateí í í í í í í í í í í í í í

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This dissertation has been submitted with our knowledge and evaluated under the guidance as Jomo Kenyatta University of Agriculture and Technology and Kenyatta University

We declare that, this dissertation is from the student's own work and effort and where he has used other sources of information, it has been acknowledged.

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## **DEDICATION**

I dedicate this work to my Father Mohamed Ismail and Mother Hayat Eltaib. I thank you for your unconditional support during my studies. I am very honoured to have you as my parents. I love you! I dedicate this work to my sisters; Somai, Etesar, Fatima, Khadiga, Eman and Safa and brothers Amar, Yasir, Ahmed, Mustafa and Abubakar for their words of encouragement and push for tenacity ring in my ears. I also dedicate this dissertation to my many friends and family who have supported me in one way or another. Finally, I dedicate this work to the soul of my late aunt Amal Eltaib and uncle Hawa Mohamed.

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## ABSTRACT

Supermarkets are expanding rapidly in Africa and particularly in Kenya. As they consolidate and increase their market share, they may be large enough to exert market power and may have both negative and positive impacts on the suppliers and consumers of agricultural produce, especially small-scale vegetable producers. Vegetable production is an important cash crop for most rural and peri-urban farmers. However, the participation and access to supermarkets vegetables supply system is a key challenge influencing small farmers vegetable producers. The objectives of the study were: To determine the farmers supply practices and constraints of vegetable supply in Kiambu county; to determine the factors that influence the choice of participation in the supermarket channel and their impact on farmer income and to evaluate the supermarket requirements in terms of quantity, prices and inputs production cost compared to traditional market. Quantitative and qualitative data were used. Five supermarkets were purposively selected within Nairobi (Tuskys, Uchumi, Naivas, Nakumatt and Ukwala) based on the volume and supply of vegetables. using statistical information from the district agricultural office on vegetable production vegetable farmers were sampled randomly. Farmers who participated in supermarket channels were sampled using complete lists obtained from supermarkets and supermarket traders. In total, the sample comprised 120 farmers , 60 were supermarket suppliers and 60 were supplying vegetables to traditional markets. A key informant interview for supermarket managers was done. The survey of farmers producing vegetable was carried out using a structured questionnaire. Data was analysed using descriptive statistics such percentages, logistic regression model and analysis of variance (T-test). The

descriptive statistics results showed that 71.7 % of the farmers reported that the major constrain experienced in adhering to grade and standard was failure to meet standard produce and 44.2% of the farmers reported that major constrain in transporting produce to both markets was poor roads networks. The logistic regression showed that extension, access to credit, transport, farm size, labour quality and education level were highly important variables that positively influencing small-scale farmer participation in supermarket supply chain. The method of supply negatively affected the participation in supermarket supply chain. The mean comparisons of income between the two groups of farmers show that farmers supplying fresh vegetables to chain supermarkets had a significantly ( $p < 0.001$ ) higher income, compared to those supplying to traditional markets. The results showed that farmers supplying vegetables to supermarket used more inputs and labour, than those supplying to traditional markets ( $p < 0.001$ ). This study concludes that The major constraints were identified to be poor road networks, falling to access the credit for the production and were not able to adherence to grade and standard. extension, access to credit, transport, farm size, labour quality and education level these factors were found to be highly important variables that positively influencing small-scale farmer participation in supermarket supply channel. The methods of supply negatively affected the participation in supermarket supply channel. Supermarket required large quantity and pay better price compared to traditional market. It was recommended that public programs and government policies should aim at opening up access to credit, improvement of road networks and provide training through extension offices to help small-scale farmers to produce large and high quality of vegetable supplied on time. Farmers should expand farm sizes and also access to credit since such assets significantly influence supermarket channel access. The

government should provide extension services to improve vegetable production. Supermarket plan and police should aim up to provide transport services to make that the vegetable reach on time to supermarket. Are these recommendation based on your conclusions

# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 Background

The demand for food, both of crop and animal origin, is increasing globally and especially in developing countries due to increases in population and incomes and urbanization (Mengesha, 2012). At the same time, there is a change in the consumer preferences as people take into consideration, health, nutritional, astronomical and environmental issues. Consumers in developing countries have also been exposed to these global trends due to the ease of communication and travel (Mendelsohn & Olmstead, 2009). The delivery of food from producers to consumers is extended from rural markets and regional wholesale markets to supermarkets in urban areas where consumers can get all goods under one roof. Stakeholders in agriculture, policy makers, large and small-scale farmers, input suppliers, traders and value addition industries have to respond to these demands and changes. It is no surprise, then, that policy makers are turning to the value chain paradigm from the traditional farming system approach. The increasing, dominance of multi-national retailer and processors has brought to the fore issues concerning market power in the food, and concern of how the activities of these firms influence supplier and consumers. (Dobson & Waterson, 1997).

As supermarkets consolidate and increase their market share, they may be large enough to exert market power, may have both negative and positive impacts on the supplier, consumers of agriculture, and manufactured processed product. The increasing demand for high-value food products in developing countries is creating incentives for expansion of supermarkets (Neven *et al.*, 2006; Reardon *et al.*, 2003). Therefore, to meet rising consumer concerns, emerging supermarkets increasingly adopt tighter vertical coordination involving direct procurement from farmers. These

changes have crucial implications for farm households. While there is potential for exclusion of some farmers due to the stringent requirements imposed by supermarkets, there are also potential welfare gains for farmers who have access to these channels. Stable prices and contractual arrangements offered by supermarkets for instance, improve income flows for farmers, in supermarket channels. Part of the development challenges is to commercialize smallholder agriculture in Africa. This commercialization could be achieved by linking small farmers to agribusiness firms such as agro-processors and supermarkets to improve household income in rural areas and spur economic development in the developing countries. This might provide a solution to Africa's problem of lack of market access. Africa is beset with various kinds of market failure and in some cases missing market in both input and outputs which make it difficult for small-scale farmers, processors manufacturers to access markets because of high transaction costs(Dejaury et al., 1991;Makhuro,2001).Availability and accessibility of markets are prerequisites for agriculture and industrial development. Therefore, supermarkets offer an opportunity for farmer and food processors to access market for their product if, and only if, conditions for accessing markets are conducive for small-scale farmers and processors. Markets play a major role in this consumption: about 70% of rural households sell some amount of fresh produce, and over 90% buy an average of about Ksh400 of additional produce every month in markets. In urban areas, nearly 100% of households spend an average of over Ksh1, 000 each per month on market purchases of fresh produce. Total market sales of fresh produce in urban and rural areas of Kenya likely average Ksh50 billion (Sebstad & Snodgrass, 2004).

Most vegetables have a short shelf life, and are not processed before reaching consumers (except for slicing, dicing, mixing, and packaging). These characteristics mean that the marketing system, which links farmers and consumers of fresh produce, has a preponderant effect on the level and stability of supply and prices, on the real incomes of consumers and especially farmers, and on the

quality and safety of these foods. Marketing systems are not static: they change as production patterns, consumption patterns, and technology change, and Kenya is no exception. These changes in Kenya have received a great deal of attention over the past two years, especially as regards the rapid rise of supermarkets, and their potential effects on farmers and consumers. (Ayieko, 2005).

## **1.2 Problem Statement**

The change in food supply systems and rise of one-stop supermarkets is likely to affect smallholder farmers negatively as a result of their inherent weaknesses in capital, technology and economics of scale. Supermarkets prefer to source/ procure their products from large to medium farms and large processing/ manufacturing firms in the developed countries (Timmer, 2004). This implies that small-scale farmer, processors and manufacturers may be potentially excluded from these lucrative urban markets. In late 2003 Kenya supermarkets shared less than one per cent of all food purchased in urban areas (Clare, 2002). (Source and clarify the sentence, it is not clear) Thus, while small-scale farmers' exclusion from large supermarket supply chains is a reality, it cannot be considered among the top tier of rural policy concerns in this area of the world; nor is it likely to become a top tier concern over the next 10-20 years in most countries, given projected supermarket shares over this time (Tschirley, 2007). Also in Kenya supermarkets already account for 20% of food retailing in urban areas (Ariga & Ngugi 2007). While the focus of supermarkets is largely on processed foods, they are also gaining shares in fresh product markets. In Kenya, supermarkets accounted for about 4% of urban retailing in fresh fruits and vegetables in 2002, with a rapidly rising trend (Neven & Reardon 2004). Because of the high cost of transacting with small-scale producers supermarkets prefer to source from large-scale farmer and processors further marginalizing the small-scale farmers.

Fresh vegetables farmer may need to invest in cold storage and transport facilities in order to deliver products of high quality on time to supermarket, Empirical evidence shows that many small

producers in Latin America and Africa are not able to meet these conditions and many are struggling to comply with requirement set by supermarket(Reardon et al., 2003). The situation is even worse for small vegetable producers, whereby, the retail market is no longer profitable and small farmers have no access to supermarket. In Kenya, vegetable producers can hardly make their produce to reach the supermarket, this because of high standards and regulation in supply system. This has led to increase income loses especially in the urban areas, which consequently led to poverty and food insecurity in many part of Nairobi and nearby production areas.

### **1.3 Objectives**

#### **1.3.1 Overall Objective**

The main objective of this study was to evaluate the participation of vegetable producers in the supermarket food supply system in urban areas.

#### **1.3.2 Specific Objectives:**

1. To determine the farmers supply practices and constraints of vegetable supply in Kiambu county.
2. To determine the factors that influence the choice of participation in the supermarket channel and their impact on farmers' income.
3. To evaluate the supermarket requirements in terms of quantity, prices and inputs production cost compared to traditional market.

### **1.4 Research Hypotheses**

1.4.1 There are no any constrains facing vegetables supplier in both markets whether supermarket and traditional market chain.

1.4.2 Participation of small-scale farmers in supermarket supply chain are not influenced by any factors and has no impact of the farmers income .

1.4.3 Supermarket and traditional market have the some requirement in terms of price quantity,prodcution cost.

## **1.5 Justification**

The population of Kenya in the 2009 census was 38,610,097 with 26,122,722 (67.7%) people living in the rural areas and 12,487,375 (32.3%) in the urban areas. Most of the people in rural areas derive their livelihoods mainly from agriculture and due to their higher poverty and subsistence existence need support in their farming with production technologies and access to markets. At the same time, there is increase in peri-urban farming and specialized farming using improved technologies such as greenhouses which small-scale farmers may not be able to afford. This study generated information on factors that influencing participation of small-scale farmer in supermarket supply chain. The results generated will also contribute in policy making by ensuring that enabling policies are enacted to support the smallholder farmers by integrating them hence improving supply chain . This will in turn strengthen the chains between producers, retailers and consumers and increase market share of products sold through formal channels like supermarkets. The threats to the expansion of the livelihoods of small-scale farmers in rural areas (e.g. agricultural labourers) could be turned into opportunities through mutually beneficial partnerships between supermarkets and small-scale farmers and a macro policy framework that protects the economic interests of small-scale farmers. The expansion of chain supermarkets in Kenya may be beneficial to consumers who may access high quality low priced



food products especially in the processed food categories. Small-scale farmers who have managed to negotiate contracts with supermarkets are able to supply vegetable to these supermarkets. Participation in the supermarkets vegetables supply system may be influencing positively on these farmers. The higher incomes have been a powerful determinant of strong self-motivated amongst supermarket- channel farmers. Supermarket may be so beneficial to small-scale farmers if they can access them be part of supermarket vegetable supply system.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Global Overview of Supermarket Development

The last decade has seen increased interest in the supermarkets in developing countries. This is probably a result of realization that supermarkets are no longer a privilege of the rich (Reardon, 2003). In Kenya there are currently over 400 supermarkets that are projected to control almost 50% share of food trade, with fresh vegetables taking a bigger portion (Government of Kenya, 2007). Nakumatt is the largest supermarket in Kenya followed by Uchumi, which is a public limited company with an extensive network countrywide. Tusksys is probably the third largest supermarkets in the country maintaining branches in the major cities and town. Another supermarket with a notable presence in several towns is Ukwala (Weatherspoon et al 2003).

In Kenya, the sale of the fruits and vegetables in supermarkets is growing and slowly spreading out of Nairobi's middle and upper class areas into poorer areas and rural towns/cities. The two dominant chains, Uchumi and Nakumatt in Kenya have about 70% of the supermarket market share with medium and smaller supermarkets combining to make 30% of the market share. (Weatherspoon *et al*, 2003). With medium and smaller supermarkets, combining to make 30% of the market share. The Nakumatt and Uchumi chains have now opened branches in major towns of Kenya. Uchumi has been undergoing an ambitious expansion program locally and in Uganda. The strong strategic positions of Uchumi and Nakumatt have made it difficult for foreign competitors particularly those

from South Africa. In the year 2000, there were 200 supermarkets and 10 hypermarkets (Stamoulis, 2002). In 2004 it was estimated that the number of supermarkets and hypermarkets had increased to 204 and 11 respectively in Kenya (Neven and Reardon, 2004). Retail outlets for fresh fruits and vegetables targeting upper and middle-income groups are said to account for 20% of marketed volume of food in urban areas with 70% of the products produced locally and 30% imported (Gan, 2000). Similarly, data from Tegemeo Institute 2003 urban survey estimates that approximately 7% of the respondents were purchasing fruits and vegetables from large supermarkets and less than 1% from small supermarkets in Nairobi.

Supermarkets though not very important currently are nevertheless becoming a more important source of fresh fruits and vegetables in Nairobi. Currently, wholesale and open markets remains the most important outlet for fruits and vegetables in Kenya. In addition to that, kiosks and hawkers, due to their extensive location coverage, also cater for a substantial consumer base in Nairobi and other urban areas. In the food retail market, supermarkets are the fastest growing segment in rapidly growing urban areas where incomes are higher. In Uganda, growth of supermarkets is estimated at 9 percent per year (Weatherspoon et al 2003). Shoprite and Uchumi account for 95% of supermarket share in Kampala in less than 3 years, (Weatherspoon et al 2003). Other several locally owned medium to small supermarkets spread out in all the suburbs also, different petrol stations run supermarkets alongside their business.

In Kenya, vegetables constitute a significant portion of the horticultural output. In 2003, vegetables constituted about 35 per cent of the horticultural export volumes (IPAR 2005). Indigenous vegetables, are mostly grown in rural areas and support a significant proportion

of households. The rural population depends on it both as a source of food and income. Improvement of this sub sector can be a milestone in the fight against poverty in the rural areas. The consumption of traditional vegetables is increasing significantly amongst the urban population (Ngugi et al 2006). This is because of the growing recognition of their high nutritional value. For example, Amaranthus has 13 times more iron and 57 times more Vitamin A than cabbages (IPGRI 2006). The vegetables are a very good source of Vitamin A, B complex, C, and E. Nonetheless, there is no explicit government policy, which attempts to promote production and marketing of these products in the high-demand areas, such as Nairobi.

## **2.2 The quick Spread of Supermarkets in developing Regions**

The diffusion of supermarkets represents a major concentration in the retail industry structure of developing regions. Supermarkets are spreading very rapidly in developing countries, a phenomenon that begun mainly in the past decade. The diffusion rates have varied over regions, characterized by three waves. The first wave started small in the early-to-mid-1990s, and built into a major force in retail by the end of the 1990s in South America, East Asia outside China and Japan, Northern-Central Europe, and South Africa. The average share of supermarkets in food retail went from a mere niche roughly, 10 to 20 percent of food retail circa in 1990 to dominate the market with 50 to 60 percent of food retail by the early 2000s. When companies of these results with 70 to 80 percent share that supermarkets have in food retail today in the United Kingdom, United States, or France, and one sees a trend toward convergence. Note that there is a second set of countries perched at the tail end of the first wave and near the start of the second wave that we class

with the first wave, with their supermarket take-off in the mid-1990s; examples are Costa Rica, Chile, South Korea, Philippines, and Thailand, all with circa 50 per cent share. The second-wave countries include parts of Southeast Asia and Central America, Mexico, and Southern-Central Europe, where the share went from circa 5 to 10 per cent in 1990 to 30 to 50 per cent by the early 2000s, with the take-off occurring in the mid-to-late 1990s. The third-wave countries include countries where the supermarket revolution take-off started only in the late 1990s or early 2000s, reaching about 10 to 20 per cent of national food retail by circa in 2003 (Reardon et al, 2003). (reference) They include some countries in Central and South America (such as Nicaragua, Peru, & Bolivia), Southeast Asia (such as Vietnam), China, India, and Russia. The latter three are the foremost destinations for retail foreign direct investment (FDI) in the world and are each a fascinating third-wave case, with supermarket sector growth rates circa 20 to 40 per cent per year, which is a fast change (Reardon et al, 2003) (reference).

Sub-Saharan Africa presents a very diverse picture, with only one country (South Africa) firmly in the first wave of supermarket penetration, but the rest either in the early phase of the third wave take-off of diffusion or in what may be a pending, but not started, fourth wave. Kenya, Zambia, and Zimbabwe are in the early phase of the third wave and have substantial numbers of supermarkets, initiated by both domestic investment and FDI from South Africa. A middle-class base and high urbanization rates attracted this investment, but supermarket penetration is still where South America was in the early 1980s. The share of supermarkets in urban food retail is about 10 to 20 per cent in the large/medium cities and the share of produce hovers around 5 per cent (Neven & Reardon 2004). Even with mainly domestic investment and some South African retail capital and technology, there is still

considerable uncertainty about the rate at which the supermarket sector in these countries will grow. The great majority of Africa..., however, can be classified as not yet entering a substantial take-off of supermarket diffusion: At the upper end of this group are a score or so of supermarkets in countries such as Mozambique and Tanzania, Uganda, and Angola, places where South African retail FDI is just starting. (Weatherspoon & Reardon 2003) and may a decade or two from now to be recognizable as a fourth wave. Supermarkets in these countries show signs of early growth and are surrounded by a more general trend of the growth of self-service in relatively large semi traditional stores in urban areas. At the lower end of this set are the very poor countries of Africa such as Ethiopia, Sudan, Burkina Faso, and Mali. It is unlikely that the lower end of this set of countries will see supermarket growth for several decades. Even then, it will be dependent on higher urbanization rates, better investment climates, lower transaction costs, improved infrastructure, much more rapid income growth, and political stability. It will take significant improvements in most of these areas to stimulate FDI and global supermarket chains (Neven & Reardon 2004).

It has been shown that supermarkets, even in places like South Africa and Kenya, have spread beyond the middle class into the food markets of the urban working poor. Nevertheless, the supermarket sector usually requires a critical mass of middle-class urban consumers to build the initial base before expanding into the rest of the urban market. Two important qualifications regarding the general diffusion patterns discussed above are to note: (1) Diffusion occurs at differential rates over inter-country space. For example, Dries, Reardon, & Swinnen (2004) noted that there have been three waves of diffusion of supermarkets in the Central and Eastern European region, each wave has a subset of

countries. (2) Diffusion occurs at different rates over the space within a country and over socioeconomic strata. The diffusion trajectory is from large to middle to small cities and eventually to rural towns, and from upper to middle class and then even to the poor. For example, in most of the first-wave and part of the second-wave countries, and starting even in some of the third-wave countries, supermarkets have penetrated beyond the food markets of the middle class into those of the urban poor.

### **2.3 Focus on supermarkets**

On the one hand, there is evidence that, large-scale processors such as global dairy firms such as the Swiss firm Nestlé in Brazil (Reardon & Farina 2001). T. REARDON vegetable processors such as the Swiss firm Gerber, or cereal processing. Firms like the Mexican firm Bimbo. Set private standards for quality and safety of products in the developing country markets ó often in advance of the specification to them of standards regarding processed products by the supermarkets, simply because they are harmonizing these standards with standards of their global operations to increase efficiency. This can lead to harmonization of private standards for processed foods over regional markets, such as in Mercosur (Farina & Reardon, 2000).

Supermarket chains, tend to source from large-scale processors in order to reduce transaction costs by using a few large suppliers, who have adequate logistics and transportation capacity, to be assured of consistent quality and safety from companies with the capacity to monitor their quality .(and enforce standards on their suppliers in turn), and to get the SKU (stock-keeping unit). Range they want in "one-stop shopping" Examples include the Xiaobaiyang chain in Beijing shifting from 1000 to 300 processed-food

suppliers as it has centralized procurement over the past two years (Hu et al., 2004), or the leading Russian chains focusing on a handful of large foreign and domestic dairy-products manufacturers for the reasons noted above (Dries & Reardon 2005). Moreover, large - processors tend to want to supply to supermarket chains, because the volumes are larger, their market coverage is broader and growing rather than shrinking as with the traditional retailers. They can also build product diversity and thus manage market risk through them. Supermarkets have the cold chains that the traditional retailers do not have, to handle the shift that suppliers seek toward shorter-shelf-life products with higher margins.

#### **2.4 Drivers of Growth**

The growth of supermarkets is largely driven by increasing income, urbanization, change in lifestyle and economic liberalization (Chowdhury, *et al.*, 2005). It is meaning driven by demand and supply side factors. On the demand side, urbanization is a primary explanatory factor because urban consumers have higher disposable incomes, less time to prepare meals and less opportunity to grow food themselves. The other factor that may influence the emergence of supermarkets in Kenya is the engagement of women in gainful employment in the formal and informal sectors. In this way, women are likely to spend less time buying food and thus less time to spend in wet markets. On the supply side, the growth of super markets is driven by competition, market and trade liberalization and the introduction of new technologies. Some supermarkets perform value addition of their goods and thus making them more appealing to the customers. e.g. Nakumatt supermarket has a specialized wholesaler fresh juice limited that performs value addition activities which includes trimming, weighing and packaging. The wet markets where they trade on the other hand are



more often than not cluttered, dirty, disorganized and inaccessible especially during the rainy seasons (Neven & Reardon., 2003).

## **2.5 Supermarket Procurement Strategies**

In Kenya large supermarkets, have two distinct procurement strategies i.e. decentralized and centralized. In the centralized system, the decisions on procurement of supplies which, includes ordering of product, delivery and distribution as well as payments are made from the headquarters. However, payment of the products is made through the headquarters while individual chains are allowed to make decision on the volumes. In the decentralized system, the chains are allowed to make decision on choice of supplies among certified vendors, decide on when to order and deliver as well as on volumes. (Neven et al., 2005). Additionally large supermarkets have entered into contracts with medium and large scale suppliers who are able to deliver large quantities of the products throughout the year. Supermarkets prefer to procure goods from large-scale farmers because that is where they get the greatest quantities of goods as compared to small-scale farmers. Additionally the large-scale farmers are able to supply goods on credit and conform to the standards set by the supermarkets (Neven & Reardon, 2003).

## **2.6 Impact of the Supermarkets on the Small Scale Farmers**

Currently, the sourcing of Fresh fruits and vegetables by Supermarkets in Kenya tends to favour the Medium, large and other organized producers, which is likely to impact, negatively on smallholder farmers, who have always counted on supermarkets as being one of the ultimate retailers of their products either from the open air markets or directly by brokerage. As the supermarkets and other institutions like hospitals and hotels eventually,

tighten their requirements on traceability and consistency in volume and quality. Smallholder producers usually are under-capitalized and face tough competition from larger producers and traders with financial base to sustain these demands (Neven & Reardon., 2003). Supermarkets therefore are increasingly looking for supplier channels that ensure quality standard are maintained possibility of traceability to farmers if need arises, a steady supply of expected volume all year, and -consistent delivery times.

For smallholder producers to fit in the emerging structure, they have to meet quality standards and be well organized. Some changes occurring in the market pose challenges to small and medium-scale entrepreneurs and unless they adopt new strategies, their participation in market would continue to dwindle. However, while the demand for these commodities is gaining popularity in Kenya, the high standards set by the supermarkets in terms of quantity, quality, timing, safety, packaging, etc., can act as a barrier to small-scale farmers who are limited by finances (Neven & Reardon., 2003). This is because for the small-scale traders to meet these standards, they must invest heavily in modern methods and technology. Limitation in finances, management and marketing skills are the major hindrances towards meeting these stringent requirements. However, these constraints can be partially addressed by the small-scale farmers forming groups/cooperatives where they would probably pool resources (Nyoro, 2004).

## **2.7 Resurgence of high demand for consumption of indigenous vegetables**

Over the past ten years, consumers have become increasingly aware of the nutritional and medicinal values of vegetables and the demand has been on the rise especially in major urban centres. The supply of these vegetables has however not matched this growing demand. Farmers are semi commercially oriented poor farmers, owning less than two acres of land. They are not organized, face problems of inadequate inputs and lack of market information. In addition, they are not able to access high value markets and are often exploited by middle men. The lack of awareness of production and utilization of the vegetable is also another hindrance. Home garden production of vegetables can improve food supply and family nutrition especially in the rural areas of Kenya (Cheatle & Nekesa 1993. Chweya 1997).

Responding to the changing consumption patterns and market opportunities occasioned by the growing demand for these vegetables in urban centres, a number of farmers have come together to form producer groups to get around their constraints and meet the conditions within the markets. Key retail outlets include supermarkets and established institutions (hospitals, hotels, grocers), which impose stringent conditions on quality of the produce. The retail outlets demand specific standards for leaf size and appearance, and put a premium on pesticide maximum residue. Thus if farmers are not organized it is quite difficult to meet these requirements. The factors that are contributing to the expansion of domestic High Value Agricultural Products (HVAPs) markets include; urbanization, a change in dietary preferences, increased awareness about the health benefits of HVAPs and general income growth in some countries in Sub-Saharan Africa (Temu & Temu 2005).

The demand has been growing rapidly in the world market throughout the 5 year period forcing supermarket chains to source from multiple producing countries thereby exploiting opportunities provided by differences in the climatic conditions and seasons around the world. In Kenya, farmers grow both exotic and vegetables because they are preferred and are easily available in rural areas, have a good taste and take short time from planting to harvesting. Nevertheless, many people do not know the value of the vegetables as compared to the exotic ones. Therefore there is need to expose the farmers to their nutritional value and utilization. Family Concern, ministry of agriculture through the department of home economics and International Plant Genetic Research Institute (IPGRI) has been instrumental in creating awareness among farmers and consumers on the nutritional values of the indigenous vegetables. Family Concern has also trained farmers in production. Rural-urban migration has contributed immensely to the growth and demand of HVAPs in the markets. This in turn has generated a lot of pressure for a change in production of HVAPs in the country. Increased opportunities in the urban areas and stagnation in agricultural productivity is responsible for high rate of rural-urban migration in Sub-Saharan Africa. This trend has posed new development issues in African cities.

## **2.8 Supermarkets and the Exclusion of Small Farmers**

Concern about exclusion of smallholder farmers from supermarket supply channels is most acute in fresh produce, since farmers can directly market it to supermarkets. Concerns are based on the efforts of fresh produce procurement managers to provide consumers with a stable, year-round supply of safe, high quality produce at competitive prices.( & Emongor Kirsten, 2009) Farmers that cannot meet these criteria, especially the need for fixed

quantities every week of the year, fall off the supermarkets' preferred supplier lists. Smallholder farmers are especially challenged in this regard, and evidence is mounting that all but a tiny minority, whether independent or in farmer groups, are unable to remain on preferred supplier lists on a sustained basis. As a result, medium- and large-scale farmers supply the overwhelming majority of produce moving through preferred supplier programs in Africa. Yet these programs carry a tiny fraction of the food trade in African countries (Tschirley, 2007).

## **2.9 Logistic Regression Analysis Conceptual Framework**

There are many statistical approaches to predictive probability modelling. However, the most popular of these is the logit or logistic regression model Carmichael, 1990) 'Introductory Remarks on Regional Analysis', five popular techniques (i.e., density transfer, density regression, significance regression, discriminant function analysis, and logistic regression analysis) of predictive modelling were critically scrutinized. Logistic regression, although very similar to discriminant function analysis, was less constrained by statistical assumptions. It was also found to provide more powerful and consistent predictions when the aforementioned statistical assumptions were violated (Kvamme, 1983). In addition, logistic regression analysis readily accepts mixtures of nominal, ordinal, interval, and ratio scaled independent variables. Use of logistic regression was also scrutinized and wholeheartedly supported by Parker (1985) in her article: 'Predictive Modelling of Site Settlement Systems Using Multivariate Logitics.' If one considers all these advantages, plus the fact that the resulting formula from logistic regression is easily interpreted, logistic regression becomes the clear choice for use in

participation supply system model.

Logistic regression employs the use of independent variables to create a mathematical formula that predicts the probability that a site occurs on any give parcel of land (Carmichael, 1990). The key to logistic regression is that the dependent variable is dichotomous. Unlike multiple regressions, which predict scores for a continuous dependent variable, logistic regression predicts the probability of membership in one of the available groups (i.e. site/non-site). The independent variable(s) in this model are predictors of the dependent variable and can be measured on nominal, ordinal, interval, or ratio scale. The relationship between the dependent variables and the independent variable(s) is nonlinear. It is this relationship that is utilized to predict the probability of group membership for each case in the model. The standard logistic regression formula for a model with multiple independent variables is:

$$p(B) = \frac{\text{Exp}(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_i x_i)}{1 + \text{Exp}(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_i x_i)}$$

Or simplified

$$p(B) = \frac{1}{1 + \text{Exp}(-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_i x_i))}$$

Where  $p(B)$  is the probability ( $p$ ) that case  $\tilde{o}$  is a member of group B, such that  $p(B) = 1$  (i.e. site presence);  $\text{Exp}$  is a function that raises the number  $e$  exponentially to the power of the value enclosed in parentheses. Where the number  $e$ , Euler's number, is the

irrational number whose natural logarithm is 1 ( $\ln(1) = 2.718281$ );  $\beta_0$  is the intercept constant; the  $\beta_j$ s are the coefficients for the independent variables; and the  $x_j$ s are the independent variables for the corresponding coefficient.

The  $\beta_0$  parameter, called the intercept, represents the value of the dependent variable ( $Y$ ) when  $x$  is zero. The parameter  $\beta_j$  represents the change in  $Y$  associated with one-unit increase in  $x$ , or the slope of the line that provides the best linear estimate of  $Y$  from  $x$ . In linear regression, the least squares method is most often used to estimate parameters (i.e.,  $\beta_0$  and  $\beta_j$ ). This method selects those values of  $\beta_0$  and  $\beta_j$  which minimize the sum of squared deviations of the observed values of  $Y$  from the predicted values based upon the model. To estimate  $\beta_0$  and  $\beta_j$  coefficients for the independent variables in the logistic regression model, two methods are commonly used: the maximum-likelihood and the least-squares regression fitting procedures (Warren, 1949). Unlike linear regression, the least-squares regression approach is plagued with many statistical problems, so the maximum-likelihood fitting procedure is most frequently used (Hosmer & Lemeshow 1989). Although the maximum-likelihood method requires a complex series of iterations in which trial coefficients are proposed, tested, and refined to find an optimum solution, current statistics software and computer hardware make this ideal approach feasible. In general, the maximum-likelihood technique is used to maximize the log-likelihood function, which indicates how likely it is to obtain the observed values of  $Y$ , given the values of the independent variables and parameters (i.e.,  $\beta_0$  and  $\beta_j$ ) (Menard 1995). Probabilities produced from the logistic procedure are used to derive the dichotomous dependent variable for each location. To accomplish this, a *cutpoint* ( $c$ ) value must be selected to delineate sites from non-sites. Each location's probability is

compared to this value ( $c$ ) to determine membership. If the estimated probability exceeds or is equal to the cut point value then the location is considered to be a site (if  $p(B) \geq c$ , then = 1), otherwise it is considered to be a non-site (if  $p(B) < c$ , then = 0).

Recent studies on high value chains in developing countries have looked into determinants of access and potential gains from participation. This study tried to look at effects of the increase supermarkets on vegetable supply system of small-scale farmers in Kenya.



## CHAPTER THREE

### 3.0 RESEARCH METHODOLOGY

#### 3.1 introduction

Both quantitative and qualitative data were collected from the supermarkets and the farmers. This study was carried out in two phases in the first phase qualitative data was collected by means of key informant interviews with supermarket supply managers. In the second phase, survey of farmers growing supplying vegetable was undertaken. The data was coded, entered, and checked for validity, quality, and then were analyzed.

#### 3.2 Study Area and Data Sources

The study was carried out in Nairobi and Kiambu counties that are located in relative proximity to Nairobi and even before the spread of supermarkets it had been one of the main vegetable-supplying areas for the Nairobi, which is the capital city of Kenya. A survey conducted by Adeka *et al.*, (2008) recorded that some fresh fruits were obtained from as far as Uganda and Tanzania as well as South Africa.

Both primary and secondary data were used during this research. Secondary data was obtained from the supermarket procurement reports, farmer's records, government ministries and parastatals, market research companies and local and international NGOS dealing with small-scale farmers. Primary data was collected during this survey through the questionnaire, focus group discussions and key informant interviews.

A survey of farmers producing vegetables was conducted. Market were further stratified into supermarkets and open-air traditional markets and by their means of production,

whether organic or inorganic products. This study was focused on growing various vegetables for the both market open-air traditional markets and supermarkets in Nairobi. This study also got information from various supermarkets such as the means of procurement of their various products and specifically the fresh vegetables. Various supermarkets on the prices that the goods were bought and sold at volumes and their bidding criteria. This information was also targeting the buyers to get their preference and their choices of vegetable supplies.

### **3.3 Data Collection Methods**

Key informant interviews with supermarkets was done with the managers or procurement officers in the supermarkets to gather information on the source of the fresh vegetable and supermarket requirements in terms of quantity and quality for the farmers to get into contracts and supply to the supermarket. Farmers' interviews were conducted.

### **3.4 Sampling procedure**

Five supermarkets were purposively selected within Nairobi (Tusky, Uchumi, Naivas, Nakumatt and Ukwala) based on the volume and supply of vegetables. The key informant interviews were done with the supply manager at each supermarket to gather information on the sources of the vegetable and the supermarket requirements in terms of the quantity and quality for the farmer to get into the contract. Based on information from the district agricultural office, four of the main vegetable-producing divisions were chosen. In these four divisions, 10 administrative locations were purposively selected, again using statistical information on vegetable production. Within the locations, vegetable farmers were sampled randomly. Farmers who participate in supermarket channels, were sampled using

complete lists obtained from supermarkets and supermarket traders. In total, our sample comprised 120 farmers, 60 that were supermarket suppliers and 60 that were supplying vegetables to traditional markets.

Several of analytical methods tools were used to determine the effect of the rise supermarket on vegetable supply system of small-scale farmer:

Descriptive statistics of socio-economic and the demographic characteristics of the farmers, supply constraints of vegetables and key informant interviews, the observation data were used and constrains that facing vegetable supplier.

Logit model regression analysis was used to determine the factors that influence farmer participation in the supermarket supply chain and (T-test) was used to compare the income for the two group of farmers, those who supplied vegetable to supermarket and those who supplied to traditional markets, to evaluate the impact of this participation on the framers income.

Analyses of variance (T-Test) were used to compare vegetable product prices and quantities in supermarket and traditional market as well as inputs and labour use, to evaluate the impact of this participation on prices, quantities, input and labour for the two group of farmers.

### 3.6 Determinants of farmers' participation

A number of variables were identified to be used in assessing the determinants of the participation of small-scale farmers in the supermarket supply chain. Such variables were classified for practical purposes into three broad sets namely: productive, demographics and socio-economic. Within the productive set of variables were considered factors mainly related with the technological traits of the small-scale farmers surveyed, such as the use of tractor, hired labour or their land size. On the other side, the socio-economic set of variables referred mainly to factors such as access to credit and technical assistance as well as the demographics characteristics such as the gender of the head of the household, age of the farmer and the level of education. All sets of variables are used to observe their influence in farmers' decision to supply vegetables. Given that the qualitative nature of the data that was collected, it was determined that Logistic Regression Analysis model would give the best fit to the data and thus it was used to identify which characteristics were relevant in the farmers' choice to deal with supermarkets. In this a Logistic Regression Analysis model it was assumed that the values of the endogenous variable correspond to the decision of farmers to integrate to the supermarket supply chain, and otherwise. Logistic regression was estimated to identify the factors that had a bearing on farmers' supply of vegetables to supermarket and farmers used this limited dependent variable model to capture the influence of several factors on the selling of vegetable.

### 3.7 Logit Regression Function

$$Y_i = + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9$$

$$\text{Log Odds } \ln \left[ \frac{p}{1-p} \right] = \beta_0 + \beta_1 \bar{x}$$

Where by

$Y_i$  = Dummy variable that takes the values of 1 if farmers sell the vegetable to supermarkets and 0 otherwise

$P$  = Probability that farmers will supply vegetables to supermarket

$1 - P$  = Probability that farmers have not organize to supply vegetable to supermarket

$X_i$  = Vector of independent variables

$X_1$  = Gender of the farmer

$X_2$  = Age

$X_3$  = Education

$X_4$  = farm size

$X_5$  = ownership of tractor or vehicle

$X_6$  = Access to technical assistance

$X_7$  = Access to credit

$X_8$  = Coyote

$\varepsilon_i$  = Error term

**Description and expected sign of variable are included in the Logistic Regression Model**

<b>Variable</b>	<b>Definition</b>	<b>Hypothesis</b>
Gender	Dummy variable that takes the values of 1 if farmer male and 0 if farmer is female	+
Age	Dummy variable that takes the values of 1 if farmer age under 30 and 0 if farmer age otherwise	+
Education	Dummy variable that takes the values of 1 if farmer none educated and 0 if farmer attained school	+
Farm size	The number of hectares cultivated with vegetable that farmer possesses	+
Transport	It is a dummy variable, where 1 if the farmer used his own pick up , and 0 otherwise	+
Labour quality	The number of workers the farmers hired to carry out the product	+
Extension	It is a dummy variable, where 1 means that farmer has had access to technical assistance in , and 0 otherwise	+
Access to credit	It is a dummy variable that takes values of 1 if farmer has had credit in the past 4 years, and 0 if he has not.	+
The way of supply	It dummy variable, where 1 in farmers supply direct to supermarket, and 0 otherwise	-

### 3.9 Assumptions of the logistic regression

Logistic regression is popular in part because it enables the researcher to overcome many of restrictive assumption of OLD regression(Agresti,2002).The logistic regression handles non-linear effect even when exponential and polynomial terms are not explicitly added as additional independents because of logit link function on the left-hand side of the logistic regression equation is non-linear. The dependent variable need not be normally distributed (but does assume its distribution is within the range of the exponential

family of distributions, such as normal, Poisson, binomial, gamma). Logistic regression does not require that the independents be interval or the independents be unbounded (Klecka, 1997). Logistic regression assumes that error terms are independent and all relevant variables are included in the regression model. The logistic regression assumes a linear relationship between the logit of the independents and the dependent. Logistic regression uses maximum likelihood estimation (MLE) rather than ordinary least squares (OLS) to derive parameters (Hair *et al*, 1992).

### **3.10 Appropriateness of logistic regression model**

Logistic regression can be used whenever an individual is to be classified into one of two populations. Binomial logistic regression uses a dichotomous dependent variable, which is appropriate in this case because the aim is to distinguish between two groups of small-scale farmers (those who supplying vegetable to supermarkets and those who do not). Backward and forward variable selection procedures of vegetables were used to identify the important variables influencing the farmers' decision to participate in supermarkets supply system.

### **3.11 Theoretical logistic model**

The relationship between the predictor and response variables is not a linear function in logistic regression; instead, the logistic regression function is used, which is the logit transformation of the odds ratio:

$$\theta = \frac{e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i)}}{1 + e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i)}}$$

Where:

$\alpha$  = the constant of the equation

$\beta$  = the coefficient of the predictor variables.

$X$  = are the explanatory variables and log is the natural logarithm

The goal of logistic regression is to correctly predict the category of an outcome for individual cases using the most parsimonious model (Agresti, 2002). Backward stepwise regression was used. Backward stepwise analysis begins with a full or saturated model and variables are eliminated from the model in an iterative process (Afifi and Clark, 1990). The fit of the model is tested after the elimination of each variable to ensure that the model still adequately fits the data. When no more variables can be eliminated from the model, the analysis has been completed. According to Hosmer and Lemeshow (1989), there are two main uses of logistic regression. The first is the prediction of group membership and provides knowledge of the relationships and strengths among the variables. Secondly, since logistic regression calculates the probability of success over the probability of failure, the results of the analysis are in the form of odds ratios.



## CHAPTER FOUR

### RESULTS AND DISCUSSIONS

#### 4.1 Socio-economic Characteristics of Vegetable Suppliers

Table 4.1 shows the descriptive statistics of the results indicated that the majority of the farmers interviewed (70.8%) was male and 29.2% of the farmers were female. The results also showed that about (57.6%) of the farmers producing vegetable interviewed had secondary school, and about 29% had attained post-secondary school education, 13.3% had attained primary school and 0.8% had not attained school. Owing to the reality that most of these farmers are well schooled, they helped the farmers producing vegetable to be able to negotiate contract with supermarket on their own and access better prices from supplying to supermarkets. Moreover the results showed that the majority of the farmers 60% were interviewed were over 60 years of age, 34.2% were found to be within range of age between 30-60 years and slightly percentage 5% were below 30 years of age. These results show that most of the vegetable farmers in the study area have experience in farming practices and production of quality vegetables, however, this trend is worrying since farmers are aging and there seems to be very little replacement with young farmers. This observation is in line with the findings of Stella (2001) that sampled farmers that were adopters of manure, fertilizer, and of both manure and fertilizer were 55, 49 and 54 years respectively.

**Table 4.1 Socio-economic Characteristics of Vegetables Supplier**

<b>Demographic properties</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>		
Male	85	70.8
Female	35	29.2
Total	120	100.0
<b>Age group</b>		
Under 30	6	5.0
Between 30-60	41	34.2
Over 60	73	60.8
Total	120	100.0
<b>Level of education</b>		
None	1	0.8
Primary	16	13.3
Secondary	68	56.7
Post-secondary	35	29.2
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### **4.2 The Farm Enterprises' and other Source of the Income for the Farmer**

Table 4.2 shows the farmers experiences and their sources of income. The table also shows that the majority (55.2%) of the farmers producing vegetables have more than 10 years of experience, whereas 44.8% have two (2) to ten (10) years of experience. Many years of experience, help farmers to increase awareness on farming as well as crop form i.e. harvesting, the best use of manure and other inputs use. The results showed that the farmers accessed land for producing vegetables through land ownership or renting. The majority, (45%) of the farmers accessed have title deeds for the land on which they are in produce vegetable, whereas 32.5 % have freehold ownership of land, about 15 % have communal ownership of land. While small percentage accessed other type, land of ownership i.e. family owned and rented land. The result showed that the majority (69.2%) had training in agriculture 35% had attained crop production training, whereas 19.2% organic farming and about 15% were trained in marketing activities. The trained farmers

had increased awareness and the knowledge on the farm production as well as negotiation skills in the marketing vegetables. The results also showed that 51.7% of the farmers were involved in producing vegetables for supermarket and other markets did not depend on farming as the only source of income, however, of the farmer 48.3% depend on farms as their source of the income. Some of these farmers were engaged in farming as part-time activity most of them were working in formal employment, informal employment, livestock production and private sector.

**Table 4.2 Farm Enterprises and Farming Characteristics**

<b>Farm enterprise</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Farmer starting practices farming</b>		
Between 2-10 year	53	44.2
More than 10 year	67	55.8
Total	120	100
<b>Type of ownership</b>		
Title deed	54	45.0
Freehold	39	32.5
Communal	18	15.0
Other(family owned)	6	5.0
Other( rented)	3	2.5
Total	120	100
<b>Training in agriculture</b>		
Yes	83	69.2
No	37	30.8
Total	120	100
<b>Type of the training</b>		
Crop production-Marketing	42	35.0
Organic Farming-Vegetable production	23	19.2
Marketing	18	15.0
Not applicable	37	30.8
Total	120	100
<b>Farming source of the income</b>		
Yes	58	48.3
No	62	51.7
Total	120	100
<b>Others source of the income</b>		
Formal employment	3	2.5
Informal employment	15	12.5
Livestock	50	41.7
Private sector	5	4.2
Not applicable	47	39.2
<b>Total</b>	<b>120</b>	<b>100</b>

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012

### **4.3 Farmer Access to the Market and Change in Outputs and Labour use on Vegetable Production**

Farmer access to the market and change in outputs and labour use on vegetable production are shown in table 4.3. The results indicated that 23.3% of the farmers supplied vegetables to Nakumatt supermarket, whereas 28.3 supplied to Uchumi and about 23.3% had advantage of supplying two supermarkets i.e Nakumatt and Uchumi, whereas slightly 8.3% and 6.7% supplied to Ukwala and Tuskyø consistently. The result demonstrated that, the majority of farmers (51.7%) produced vegetables and supplied their produce through the distribution centre in both whether farmers supplied to the supermarket or traditional market. Whereas 48.3% of the farmers produced vegetables, and supplied directly to the supermarket and the distribution centre, as farmer sells the product to middlemen will affect the participation in supermarket supply chain, this result agrees with what (Cervantes, 2005), was found in Mexico where more product were sold to middlemen and there was the less likelihood to participate in supermarkets.

The majority (88.3%) of farmers reported that there was change in the outputs and the income, the farmers noticed that the outputs and the income level have increased since they supplied to the supermarket, while there was slightly a lower percentage of 11.7% reported that there was no change before supplying to supermarket and after in their outputs and the income. About 91.7% of the farmers reported that the number of worker in farm had increased since they started supplying to the supermarket, this could have been because of the supermarket requirement in terms of quantity and quality, for the farmer to produce a good quality and much quantity required so as to increase the number of workers. While

only 8.3 % reported that there was no change in the number of workers before and after they supplied to the supermarket, this could have been because of they had enough number workers handling the quantity and the quality required.

**Table 4.3 Farmers Access to the Market**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Farmers supermarket supply to</b>		
Nakumatt	14	23.3
Uchumi	17	28.3
Naivas	6	10.0
Ukwala	5	8.3
Tusky's	4	6.7
Nakumatt-Uchumi	14	23.3
<b>Total</b>	<b>60</b>	<b>100.0</b>
<b>The ways of supply</b>		
Direct to the supermarket	58	48.3
to distribution centre	62	51.7
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Change in outputs and income since supply to the supermarket</b>		
Increased	53	88.3
No change	7	11.7
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Change in the number of worker since supply to the supermarket</b>		
Yes	55	91.7
No	5	8.3
<b>Total</b>	<b>60</b>	<b>100</b>

Source: sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### **4.4 Farmers' Constrains in Supplying Vegetables to Supermarkets**

Most of the farmersø (44.2%) reported that the major constraint in transporting the vegetable produce to the supermarket or the distribution centre was the poor road networks (Table 4.4). This constraint had increased the cost of transport for the vegetable as well as

the availability of the transport itself. 25% of the farmers reported that, the major constraint was traffic jam along the roads. This affected the delivery time to the supermarkets and makes farmers failed to meet the supermarket requirements in regards to the contract and the delivery days for the product. 24.2% of the farmers reported that the major constraint was high cost of the transportation that increase the production cost. 6.7% of the farmers reported that damage of vegetables while on Trans is major constrain because of most of the farmers still use public transport. The majority (55.8%) reported that they were not accessing the credit for the production, this could have affected the quantity and the quality for product. Forty four point two percent (44.2%) reported that they accessed credit for the production. The majority of the farmersø (71.7%) reported that adherence to grade and standard, required by the supermarket was a major constraint. Fifteen percent (15%) of the farmers failed to reach the volumes required by the supermarkets this led to their sale to local markets. Three point three percent 3.3% reported that the pest and diseases as well as increasing the cost of buying manure. These factors and constraints led to low production, and made it difficult to meet the requirements by the supermarket.

**Table 4.4 Farmers Constrains in Participation in Supermarket Supply System**

Variables	Frequency	Percentage
<b>major constrains in transporting produce to the supermarket/distribution centre</b>		
Traffic Jump	30	25.0
Poor roads networks	53	44.2
damage because of the way of carrying it on the transport	8	6.7
High cost of transport	29	24.2
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Credit for production</b>		
Yes	53	44.2
No	67	55.8
<b>Total</b>	<b>120</b>	<b>100</b>
<b>constrains experienced in adhering to grade and standard</b>		
Failure to meet standard produce	86	71.7
fail to reach the quantity hence selling at local market	18	15.0
Market buy end up making loss due to high cost of production	12	10.0
Pest and diseases increased cost of buying manure	4	3.3
<b>Total</b>	<b>120</b>	<b>100</b>

Source: sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### **4.5 The source of Information for Farming and Marketing**

The source of information for farming and marketing shown in Table 4.5 show that (51.7%) of farmers accessed the information in regards of the farming such as the best date of farming, using of fertilizer, best seed and controlling the disease from the Extension. Whereas about 39.2% reported that they, accessing the information on farming from the Radio, furthermore slightly percentage 9.2% reported accessing the information on farming from other farmers nearby. The results showed that 55% of farmers accessed the information about marketing the vegetables from the Extension officers. 23.3% of the farmers accessed the information about the marketing from other farmers. 21.7% of the farmers reported that they accessed information from the Radio. This result implies that the farmers have awareness on the marketing and farming of the vegetables. These results



are in line with other studies done recently (Stokke, 2009) that supermarkets do have farm assistance programs that improve the productivity of local suppliers.

#### 4.6 Market Preference by Farmers

Table 4.6 indicates market preference of farmers between supermarkets and traditional market. The results showed (88.3%) of the farmers would prefer selling their products to supermarkets. They argued that supermarkets had an advantage of better prices and relatively larger volumes of vegetable delivery than traditional market. The reason they gave for their preference of traditional markets was that there was no quality and volume requirements for these markets.

**Table 4.5 Sources of the Information for Farming and Marketing**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Source of information for farming</b>		
Radio	47	39.2
Extension officers	62	51.7
Other Farmers	11	9.2
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Source of information for marketing</b>		
Radio	26	21.7
Extension officers	66	55.0
Other famers	28	23.3
<b>Total</b>	<b>120</b>	<b>100</b>

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012

**Table 4.6 Market Preference by Farmers**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
Supermarket	106	88.3
Traditional market	3	2.5
Don't know	11	9.2
<b>Total</b>	<b>120</b>	<b>100</b>

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### 4.7 Farmers' Relationship and Partnership with Marketing Channel for Vegetables

Table 4.7 shows the status of farmers' relationship and relationship with marketing channel for vegetables. The farmers were asked to indicate whether establish any relationship with supermarkets or traditional buyer for the vegetables. The results showed that the majority of the farmers (88.3%) had a relationship with marketing channels. However, 18.3% were had no relationship with marketing channels. The farmers were asked to evaluate the level of the trust in the relationship. 51.7% reported that, the level of trust was excellent. 30.8% reported high. While 17.5% reported that they had no trust with marketing channel. The farmers were also asked about the benefit that they received due to the relationship between them and the marketing channel for the vegetable. They farmers reported that it provides them Sustainable markets for the produce and a good sum of money paid at once.

**Table 4.7 Farmers Relationship and Partnership with Marking Channels of vegetable**

Variables	Frequency	Percentage
<b>Relationship with supermarket/traditional buyer</b>		
Yes	98	81.7
No	22	18.3
<b>Total</b>	<b>120</b>	<b>100</b>
<b>The level of trust formed for the relationship</b>		
Zero	21	17.5
High	37	30.8
Excellent	62	51.7
<b>Total</b>	<b>120</b>	<b>100</b>
<b>benefit received due to the relationship</b>		
Sustained market for the produce	68	56.7
all the money paid at once	31	27.5
Not applicable	19	15.8
<b>Total</b>	<b>120</b>	<b>100</b>

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### **4.8 Supply Arrangements and Contract**

The contractual status of supplying vegetable to supermarkets is shown in Table 4.8. Forty one point six seven per cent (41.67%) of the contracts were verbal, and 25% were formal whereas 33.33% had no contract agreement for supplying vegetable. The farmers reported that written contracts in most cases applied when produce was processed. The preference for verbal contract largely depended on the increased flexibility provided by the supermarket buyers or their agents. Verbal contracts provided more flexibility for the small scale farmers since they were not able to deliver requirements for supermarkets. Fifty five percent (55 %) of farmers that supplied vegetables to supermarket met the contractual conditions. Forty percent (40.0%) of the farmers reported that they had to sign a contracts, to meet certain quality standard as well as to form delivery with supermarkets while 5 % reported that they had to sign contract, to meet certain quality standards and form a relationship trust-grant credit period. Seventy eight point three percent (78.3%) of the farmers reported that, they usually received the money for supplying vegetables from the supermarket in less than a month. About 21.7% of the farmer reported that, they received money after one to two months, most of them reported that this period was acceptable to them since they received the money at once. Therefore, they have an advantage of better plan for it, such as buying new land or other technology that can help them increase the vegetable production or any other investment.

#### **4.9 Vegetables Transport to Supermarket and Distribution Centre**

Table 4.9 shows the mode of transport used by farmers for vegetable delivery to supermarket and reveals that( 55.0%) of the farmers used public transport to take their

produce to supermarkets or distribution centre 25.8% of the farmers hired pick-ups to transport their vegetables and 19.2% of the farmers used their own pick-ups.

**Table 4.8 Farmers' Supermarket Condition and Supply Arrangements (Contract)**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Kind of farmers contract with supermarket</b>		
Verbal	50	41.67
Formal	30	25.00
No contract	40	33.33
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Condition to meet in order to supply to supermarket</b>		
Sign contract-Meet certain quality standard	66	55
Sign contract-Formed relationship trust	48	40
Sign contract - grant credit period	6	5
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Period for receiving the payment after supply</b>		
Less than a month	74	78.3
One to two month	26	21.7
<b>Total</b>	<b>120</b>	<b>100</b>

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012

**Table 4.9 Transport the Vegetables to Supermarket and Distribution Centre**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>The of the transport the produce</b>		
Own Pick-ups	23	19.2
Public transport	66	55.0
Hired pick-ups	31	25.8
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### **4.10 Factors Influencing Farmers choice of Different Marketing Channels of Vegetables**

The factors influencing the probability of selecting vegetable supermarket channel in preference to traditional marketing channel were analysed using the logistic regression analysis model because the farmers' decision to choose a particular marketing channel follows a binary choice.

It was observed from Table 4.10 that the estimated coefficients of the different variables considered in the regression model, turned out to have the expected sign. The model was highly significant and correctly predicted 91.5% of the outcomes. The model chi-square of 139.212 was highly statistically significant at 5% level with a p-value of 0.000. All these tests imply that overall the model identifies the factors influencing farmers' choice of vegetable marketing channel. The probability of selling vegetable to supermarket was influenced by factors in the model. The result of the model shows that seven of the nine factors that were hypothesized influencing choice of marketing channel were significantly different from zero. One of these factors (coyote) was negatively related to participation in the vegetable channel supermarket supply chain, whereas gender and Age of farmer household were not statistically significant. The factors (Farm size, labour cost, Education, ownership of tractor or vehicle, Access to technical assistance, and access to credit) are positively associated with farmers, participation in supermarket vegetable supply system. According to the results, farm size was found to have positive effect on choice of supermarket, interpreting that the large size is more likely to participate in supermarkets supply system. These results are contrary to the findings of Akhungu,(2008) in South Africa, who reported that the farm size had no effect on choice of the vegetable market.

These could be because of the sample size and the farmers engage in vegetable supply to supermarket in South Africa were organized. The higher percentage of the vegetable product that farmers sell to middlemen, the less supply to supermarkets all else constant. These results are in line with Cervantes, (2005) in study done in Mexico. Furthermore Akhungu, (2008) in South Africa, found that the probability of selling fresh fruit and vegetable to the supermarket was influenced by farm size, ownership of tractor or vehicle, Age of household head, gender of household head and labour. Access to technical assistance and credit were found to be significant at 5% level. Both have positive sign indicating participation in supermarket supply chain. This interpreted that having access to these services increases small-scale farmers' probability of participating in the supermarkets' supply chain, holding everything else constant. This is also similar with what Cervantes, (2005), found in Mexico i.e. access technical assistance and credit increase probability of participating in the supermarkets' vegetables supply system, holding everything else constant. Ownership of own means of transport is also significantly positive and has effect on supply to supermarket. This could be an indication of the activities that the means of transport costs. For supermarket suppliers, own vehicles are used for delivery of vegetables to supermarkets which could be reducing the transport costs. Activities supported by their own vehicles tend to transaction reduce. Furthermore, Farmers supplying directly to supermarkets also gain more from supermarket participation as Compared to their counterparts supplying through traders. These results are similar to Rao & Matin, (2010) found on Kenya Supermarkets, farm household income and poverty study.

**Table 4.10 Factors that Influence farmers' Participation in the Supermarket Vegetable Supply System**

Variable	B	S.E.	Wald	Sig	Exp(B)
Constant	44.0	1.73	0.081	.006	1.33
<b>Farm characteristics</b>					
Farm size (ha)	1.41	4.01	4.46 <sup>***</sup>	.034	0.244
Labour quality	1.33	1.59	6.92 <sup>***</sup>	.015	1.00
<b>Framer characteristics</b>					
Transport	4.81	4.13	7.16 <sup>***</sup>	.022	0.007
Age	0.05	.874	0.44	.964	0.952
Education level	6.09	2.96	5.30 <sup>***</sup>	.011	.002
Gender	0.87	1.73	0.081	.634	2.38
<b>Institutions</b>					
Access to credit	7.39	20.9	6.29 <sup>***</sup>	.004	1.62
Extension	9.64	.000	5.58 <sup>***</sup>	.003	0.001
The way of supply	-4.83	3.88	6.30 <sup>***</sup>	.006	0.008

Source: Sample survey of small-scale farmers producing vegetables in Kenya June 2012  
 Indicates coefficient statistically significant at 5% level, correctly predicts 91.5% LR  
 (Model)  $X^2$  139.

#### **4.11 Comparison of Sampled Farmers' Supplying Vegetables to both traditional and super Markets**

Several variables were used to compare the means such as (farm size labour cost, number of labour, inputs cost) as well as to compare the monthly mean income for the farmers supplying to the supermarket or traditional market. This comparison was done to establish and test whether there are any significant differences between the groups of the farmers. The analysis of the variance was performed to test for equality of the means between these two groups farmer supplying to supermarket and famers supplying to traditional market.

Table 4.11 shows mean comparison of sampled farmers supplying vegetables to supermarket and traditional channel. The results showed that the mean of the farmers' income differed for the farmers supplying supermarkets compared those to supplying to traditional markets. This implies that the farmers who supplied supermarkets had mean average value of income greater than those who supplied to traditional markets. Farmers supplying to supermarkets generated monthly mean income of (KSHs 99,808.4) while farmers supplying to traditional markets generated a monthly mean income of (KSHs 21,338.4). These results are similar to those of Rao and Matin (2010) who found that, while there could be limited access to supermarkets for disadvantaged farmers, those with access could realize improvement in household income due to better price and steady flow of revenues. Given the possibility for systematic differences between farmers in the two channels, it is expected that income responses to vary depending on market channels (Rao & Matin, 2010). The results showed further that farm sizes differed significantly ( $p < 0.001$ ) between producers for super markets and those of traditional markets. It was observed that farm acres of farmers supplying to supermarkets were double the size of the farmers supplying to traditional markets. The results demonstrated that the mean farm size owned by farmers supplying to supermarket was (2.4583 ha) whereas the mean of farm size of those supplying to traditional market was (1.8908 ha). These results are similar to those of Akhungu (2008) on the impact of south Africa supermarket on Agricultural and industrial development in south Africa development community. The results further showed that the farmers who supplied to supermarkets used more labour than those who supplied to traditional markets ( $p < 0.001$ ). The difference in labour use was significant at 5% level. Farmers who supplied to supermarket used almost twice as much labour as those



who supplied to traditional markets ( $p < 0.001$ ). Farmers supplying supermarkets used more inputs, which translated into higher inputs cost compared to those who supply to traditional markets. The farmers who supplied to supermarkets most likely incurred twice as much inputs compared to those supplying to traditional markets ( $p < 0.001$ ). This could be explained by the need to meet quantity and quality standards set by supermarkets.

#### **4.12 Institutional Characteristics of Supermarkets Relation to Farmer Suppliers of Vegetables**

Table 4.12 shows the institutional characteristics relation to farmer suppliers of vegetables which indicated that 80% of the supermarkets are negotiating with farmers on prices of vegetables. About 60% of the supermarkets reported to have no written agreements with suppliers. Only 40% reported that they have written agreements in regards to quality with vegetables supplied. 60% of the supermarkets have fixed number of farmers supplying vegetables to them. The supermarkets manager reported that they have challenges in sourcing vegetables from small-scale farmers due to volumes and high costs of organizing and assisting them to meet the quality and quantity requirements. The supermarket inspect the quality of the vegetables through touch, observation as well as appearance standard requirements for supermarkets are good quality, freshness and cleanness and an appealing color. Supermarkets requirement are different from traditional retailers, supermarkets demand from their fresh vegetables suppliers: higher, more consistent quality; consistent, year round supply of larger volumes according to pre -arranged supply calendars; lower prices and participation in promotions; lower transaction costs; new products new varieties or value- added products, imports); food safety guarantees (good agricultural practices in

farming and post-harvest activities); adherence to specific logistical supply formats (transportation, cold chain, crates); more stringent delivery conditions (timing, payment terms, slotting fees, washing, grading, packaging, labeling). In order to reach all of these objectives supermarkets need to control their supply chains. Control (i.e., highly effective, highly efficient coordinated supply chains) is realized through standards (and their enforcement mechanisms), contracts, distribution centres (centralized buying), sophisticated IT systems for product flow management and communication, shorter supply channels (more direct links to farmers) and fewer (but larger) suppliers (like their customers, supermarkets prefer one-stop shopping for their procurement). The increase supermarket is likely to change future household incomes and income dynamics.

**Table 4.11 Mean Comparison of Sampled Farmers' Supplying Vegetables to Supermarket and Traditional Channel**

Variable	Mean	Standard error of mean	t-value	p-value
<b>Monthly income</b>				
Supply to supermarket	99808	43822	13.41 <sup>***</sup>	< 0.001
Supply to traditional market	21338	11536		
<b>Farm size</b>				
Supply to supermarket	2.458	0.1330	2.63 <sup>***</sup>	0.010
Supply to traditional market	1.891	0.1697		
<b>Labour cost</b>				
Supply to supermarket	32942	13692	9.81 <sup>***</sup>	< 0.001
Supply to traditional	10033	11689		
<b>Number of labour</b>				
Supply to supermarket	5.333	1.866	11.92 <sup>***</sup>	< 0.001
Supply to traditional market	2.367	0.486		
<b>inputs cost</b>				
Supply to supermarket	31520	17861	5.17 <sup>***</sup>	< 0.001
Supply to traditional market	13152	20926		

Significance at 5% level of significance-survey of small-scale farmers in Kenya June 2012

**Table 4.12 Institutional Characteristics of Supermarkets Relation to Farmers**

Variable	Frequency	Percentage
<b>negotiate with you suppliers</b>		
Yes	4	80
No	1	20
Total	5	100
<b>written agreements regarding the quality</b>		
Yes	2	40
No	3	60
<b>Total</b>	<b>5</b>	<b>100</b>
<b>fixed number of farmer who deliver their vegetables to you after every harvest</b>		
Yes	3	60.0
No	2	40.0
<b>Total</b>	<b>5</b>	<b>100</b>

Sources: supermarket key informant interview June 2012

#### **4.13 A comparison of Vegetables Area and Production Cost to both traditional and supermarket.**

Table 4.13 shows the comparison of the vegetables area production and production cost for both farmers who supplying to supermarkets and those supplying to traditional markets. This study further compared production area, labour and other input costs between farmers supplying vegetables to supermarkets and those supplying to traditional markets for number of vegetables. The results showed that the area under vegetables for supplying for supermarket suppliers was greater than that of traditional market suppliers for all vegetables except green paper. The mean labour costs were greater for supermarket suppliers than traditional market suppliers for all vegetables except Tomatoes. The some case was

observed for other input costs with an exception of Beetroot and Sweet Potatoes. A possible explanation for these results could be due to quality and quantity requirements demanded by supermarkets. In order to meet them farmers use extra costs of production such as labour for better management, amount of manure in order to realize high quality of vegetables. These results are similar to what Akhundu (2008) found out in South Africa He reported that farmers' participation is limited by the need to meet quantity and quality standards set by supermarkets. This necessitates more of inputs such as labour and manure in order to produce high quality and more quantity of vegetables, hence extra costs of production.

#### **4.14 A comparison of Vegetable Supplied per Week and Prices to both Markets**

Table 4.14 show a comparison of vegetable supplied per week and prices to both Markets and traditional markets. The results demonstrated that the volume of the quantities that supplied to the supermarket and the respective prices are more than the volume and quantities for the vegetables that are supplied to traditional markets. This gives farmers supplying to supermarket incentives, an advantage of supplying large quantities with better prices, which has a positive effect on their incomes, and livelihood. Farmers out of the supermarket supply system lose the advantage of getting opportunity to sell large quantities with better prices. This result was explained by Rao and Matin (2010) who observed that, while there could be limited access to supermarkets for disadvantaged farmers, those with access could realize improvement household incomes due to better price and steady flow of revenues.

**Table 4.13 A comparison of Vegetables area and Production Cost to both Markets**

Vegetable	Supermarket			Traditional Market		
	Area(A cres)	Labour cost	inputs cost	Area(ac res)	Labour cost	inputs cost
Spinach	.6907	10466.4	12410.4	.3333	2221.83	2529.53
Cabbage	.5530	7697.03	9212.13	.3824	3826.23	4760.33
Carrots	.4423	5576.93	7615.43	.3125	1762.53	1887.53
Beetroot	.3889	6000.03	4333.33	.2500	1200.03	9000.02
Green onions	.3333	4500.03	6333.33	.2500	1866.73	1100.03
Green pepper	.2500	6750.03	8400.03	.3646	2114.33	2442.93
Sweet potatoes	.5500	5500.40	1241.04	0.455	3335.43	3543.83
Tomatoes	.5938	10136.4	9875.03	.3793	10282.4	7140.44
Other(kales)	.6932	10466.4	9000.00	.3333	3155.23	2529.53

Source: sample survey of small-scale farmers producing vegetables in Kenya June 2012

**Table 4.14 A comparison of Vegetable Supplied per week and Prices to Both Markets**

Vegetables	Supermarket		Traditional Market	
	Quantity per Kg/ bunches	Price KSH	Quantity per Kg/bunches	Price KSH
Spinach	2131.73	15.7333	433.722	10.0000
Cabbage	1547.03	19.6061	425.002	38.3333
Carrots	8833.32	46.6667	357.142	30.3571
Beetroot	6611.12	70.0000	300.002	50.0000
Green onions	1650.03	44.0000	3166.72	20.0000
Green pepper	6250.02	47.5000	363.892	40.5556
Sweet potatoes	1000.03	47.0000	300.002	31.7500
Tomatoes	8125.02	43.7500	4635.42	32.1429
Other(kales)	1693.03	12.3488	433.722	9.8125

Source: sample survey of small-scale farmers producing vegetables in Kenya June 2012

#### **4.15 Comparison of Vegetable Quantities Required by Supermarket and Traditional Markets per Week**

Table 4.15 shows the comparison of vegetable required by supermarkets and traditional markets supplied per week. The results of test analysis showed that the quantities of vegetables supplied by farmers to supermarkets are significantly different, from the

quantities of the vegetables supplied by farmers to traditional markets ( $p < 0.001$ ). This could be explained by the need to meet the quantities of the vegetables set by supermarkets. This implies that for the farmers to participate in supermarket supply chain of the vegetables, the farmers must meet the quantities required by the supermarkets, which is almost twice as compared to traditional market supply that has no requirements. The small-scale farmers supplying to traditional markets need to come groups to shift traditional market to supermarkets supply system.

#### **4.16 Comparison of Vegetables Prices in Supermarket and Traditional Market**

Table 4.16 shows the mean comparison of vegetable prices in supermarkets and traditional markets. Realized by both suppliers the prices for all vegetable were found significantly different at 5% level ( $p < 0.001$ ). This implies that farmers supplying vegetables to supermarket get better price of the than those supply to traditional markets. Hence, the farmers supplying to supermarkets have advantage of better prices and an opportunity for increasing their incomes.

**Table 4.15 Mean Comparison Quantity Volumes Vegetable Supply per Week**

Variable	Mean quantity supplied per week	Standard error of mean	t-value	p-value
<b>Spinach</b>				
Supply to supermarket	2132.0	680.20	2.50 <sup>***</sup>	0.015
Supply to traditional market	434.00	11.500		
<b>Cabbage</b>				
Supply to supermarket	1547.0	160.36	6.98 <sup>***</sup>	< 0.001
Supply to traditional market	425.00	12.040		
<b>Carrots</b>				
Supply to supermarket	883.30	104.69	4.99 <sup>***</sup>	< 0.001
Supply to traditional	35.170	12.690		
<b>Green onions</b>				
Supply to supermarket	1650.0	838.90	1.59	0.187
Supply to traditional market	316.70	33.300		
<b>Green peppers</b>				
Supply to supermarket	625.00	144.34	3.57 <sup>***</sup>	0.035
Supply to traditional market	1229.6	11.290		
<b>Sweet potatoes</b>				
Supply to supermarket	1000.0	441.00	4.59 <sup>***</sup>	0.001
Supply to traditional market	355.00	16.180		
<b>Tomatoes</b>				
Supply to supermarket	812.50	128.43	3.34 <sup>***</sup>	0.011
Supply to traditional market	371.40	30.580		
<b>Kales</b>				
Supply to supermarket	1693.0	111.84	10.97 <sup>***</sup>	< 0.001
Supply to traditional market	464.00	7.4000		

Significance at 5% level of significance-survey of small-scale farmers producing vegetables in Kenya June 2012

**Table 4.16 Means comparison of vegetables prices per unit**

Variable	Mean price per unit	Standard error of mean	t-value	p-value
<b>Spinach</b>				
Supply to supermarket	15.73	2.84	13.22 <sup>***</sup>	< 0.001
Supply to traditional market	10.00	0.00		
<b>Cabbage</b>				
Supply to supermarket	20.00	2.70	23.48 <sup>***</sup>	< 0.001
Supply to traditional market	15.00	0.63		
<b>Carrots</b>				
Supply to supermarket	46.67	0.71	11.93 <sup>***</sup>	< 0.001
Supply to traditional	30.36	1.11		
<b>Green onions</b>				
Supply to supermarket	44.00	1.00	18.00 <sup>***</sup>	< 0.001
Supply to traditional market	20.00	0.00		
<b>Green peppers</b>				
Supply to supermarket	47.50	2.89	2.26 <sup>***</sup>	0.035
Supply to traditional market	40.56	5.91		
<b>Sweet potatoes</b>				
Supply to supermarket	47.00	2.58	10.78 <sup>***</sup>	< 0.001
Supply to traditional market	31.75	4.06		
<b>Tomatoes</b>				
Supply to supermarket	43.75	3.53	6.02 <sup>***</sup>	< 0.001
Supply to traditional market	32.14	1.49		
<b>Kales</b>				
Supply to supermarket	12.35	2.24	6.52 <sup>***</sup>	< 0.001
Supply to traditional market	10.00	6.52		

Significance at 5% level of significance-survey of small-scale farmers producing vegetables in Kenya June 2012



## **5.0 Conclusions and Recommendations**

### **5.1 Conclusions**

The supply practices of vegetable marketing in Kiambu county included spinach, cabbage, carrots, Beetroot, Green onions, Green pepper, Sweet potatoes, Butternut, Tomatoes, kales and other vegetables to agriculture production and create more jobs and improve the income. The major constraints were identified to be poor road networks, falling to access the credit for the production and were not able to adherence to grade and standard, required by the supermarket.

The factors that influence the choice of participation in the supermarket channel were extension, access to credit, transport, farm size, labour quality and education level these factors were found to be highly important variables that positively influenced small-scale farmer participation in supermarket supply channel. The methods of supply negatively affected the participation in supermarket supply channel. The higher percentage of the vegetable product that farmers sell to middlemen, the less supply to supermarkets. Participation by farmers in Kenya supermarkets supply system, increased their incomes. Farmers supplying vegetables to supermarkets had significantly higher value of sale compared to those supplying to traditional markets.

The presence of supermarkets induces challenges in the form of: delivery in moderate volumes, continuously throughout the year; higher and consistent quality and large quantity are requirements; food safety assurance and compliance with other codes of conduct; more complex delivery format (timing, packaging, refrigerated); and payment

terms to suppliers (time between delivery and payment), slotting and warehouse use fees, discounts for promotional sales of produce. These challenges are amplified by: the new competition attracted by supermarket chains offering attractive points of entry for diverted exports and foreign suppliers; the existence of fewer alternative procurement points remaining in the market as supermarkets increase their market share relative to traditional retailers, as well as consolidate; and surviving traditional retailers improving the value delivered to their consumers, thus increasing pressure on suppliers to comply with higher standards.

## **5.2 Recommendation**

Public programs and government policies should aim at opening up access to credit, improvement of road networks and provide training throughout extension office to help small-scale farmers to produced large and high quality of vegetable and mange to supply on time.

Farmers should expand farm sizes and access credit since such assets significantly influence supermarket channel access. The government should provide extension services to improve vegetable production. Supermarket plan and police should aim up to provide transport services to make that the vegetable reach on time to supermarket.

Farmers should establish better quality control systems, which may entail training suppliers on food safety and requirements, quality management and introducing traceability mechanisms.

### **5.3 Suggestion for future research**

As data becomes available, it would be necessary to carry out more research on the impact of supermarkets on the economics of Kenya in Kiambu County. As well as a complete analysis of supermarket impacts in the Kenya using general equilibrium type of models is needed, the study also recommends that a mechanism to ensure that small-scale farmers participate in supermarket vegetables supply system should be determined and more research on the practices of supermarkets.

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## 7. Appendices

### 6.1 Appendix 1: Farmers Questionnaire

**Questionnaire to assess: the effect of the rise of Supermarkets in the vegetable supply system on small-scale farmers in Kenya**

#### 1.0 General information

1.1 Date of interview: í /í í /í Questionnaire serial number: í í í í /í í í /...í

1.2 Sex of the respondent: (1) Male..... (2) Female.....

1.3 Location í í í í í . Village í í í í .í .

#### 2.0 Farmer information

2.1 Sex: (1) Male..... (2) Female.....

2.2 Age: (1) Under 30..... (2) Between 30 ó 60..... (3) Over 60.....

2.3 Education: (1) None..... (2) Primary..... (3) Secondary..... (4) Post Secondary.....

#### 3.0 Farm Enterprise

3.1 What the size of your farm? ..... Acres

3.2 When did you start farming? (1) Less than 1 year..... (2) Between 2 to 10 years..... (3) More than 10 years.....

3.3 type of ownership (1) Title deed..... (2) Freehold..... (3) Communal..... (4) Other.....

3.4 have you received any training in agriculture? (1) Yes..... (2) No.....

3.5 If yes? what type of training? (1).....  
(2)..... (2).....  
(3)..... (4).....

3.6 Is farming your only source of income? (1) Yes..... (2) No.....

3.7 If not, what your main source of income (1) formal employment..... (2) Informal employment..... (3) Livestock..... (4) Private sector.....

3.8 What type of assets do you possess in your farm?

Type of capital asset	Number	Date of purchase	Value
Oxen-drawn implements			
Tractor			
Pick-up			
Sprayer			
Sorting/packaging shed			
Greenhouse			
Irrigation system			
Other			

3.9 What are the costs of producing the following vegetable?

Vegetable	Area per acres	Labour	Other inputs (Ksh)
Spinach			
Cabbage			
Carrots			
Beetroot			
Green onion			
Green peppers			
Sweet potato			
Butternut			
Tomatoes			
Others			

#### 4.0 Access to market

4.1 Where do you sell your produce? (1) Supermarket..... (2) Farm gate..... (3) Local Market..... (4) Other.....

4.2 If farm gate or local market? Explain why not to the supermarket?  
 .....  
 .....  
 .....

4.3 If other? Explain?  
 .....

4.4 If supermarket? Which supermarket do you supply to?  
 .....

4.5 When did you start supply the named supermarket?  
 (Year).....

4.6 What quantities of produce do you supply to the supermarket per week or per month?

Type of product	Quantity supplied per week/month	Price per unit	How do you supply? 1- direct to the supermarket 2- to distribution centre
Spinach			
Cabbage			
Carrots			
Beetroot			
Green onion			
Green peppers			
Sweet potato			
Butternut			
Tomatoes			

4.7 What changes have occurred in your output and income since you started supplying to supermarkets? (1) Increased..... (2) Decreased..... (3) No change.....

4.8 Since you started supplying to supermarkets, have you increased the number of workers in your farm? (1) Yes..... (2) No.....

4.9 If yes? What are the changes in terms of workers and wage? Before supplying the supermarket..... after supplying the supermarket.....

4.10 What benefit have you obtained since you started supplying the named supermarket/s?  
.....  
.....  
.....

**5.0 Terms and Condition**

5.1 What condition do you have to meet in order to supply to the supermarket? (1) Sign contract..... (2) Meet certain quality standard..... (3) Grant credit period..... (4) Formed relationship of trust..... (5) Other.....

5.2 If on contract? Which kind of contract? (1) Verbal..... (2) Formal..... (3) Other.....

5.3 How long does it take for you to receive your payment after supplying to the supermarket? (1) Less than a month..... (2) One to two month..... (3) More than two month.....

**6.0 Relationship and partnership**

6.1 Have you formed any kind of relationship with supermarket/ traditional buyer for your product? (1) Yes..... (2) No.....

6.2 What level of trust have you formed? (1) None..... (2) Good..... (3) Very good.....

6.3 What benefits have you received due to this relationships?  
.....  
.....  
.....

**7.0 Transport**

7.1 How do you transport your produce to the supermarket/ distribution centre? .....  
.....  
.....

7.2 How much does it cost you to use the mode of transport you have mentioned?  
.....  
.....  
.....

7.3 What are the major constrains in transporting your produce to the supermarket/ distribution centre?  
.....

.....  
.....  
.....

**8.0 Grade and standard**

8.1 What grade/ standard do you have to meet in order to supply to the supermarket?

.....  
.....  
.....

8.2 What cost do you incur in meetings this grade and standard?

.....  
.....  
.....

8.3 Who meet these costs?

.....  
.....  
.....

8.4 What problems/ constrains have you experienced in adhering to these grade and standard?

.....  
.....

**9.0 service provision**

9.1 Do you receive any assistance for the supermarket you supply to? (1) Yes..... (2) No.....

9.2 If yes/ what kind of assistance do you receive?.....

..... 9.3 Do you get credit for production? (1) Yes..... (2) No.....

9.4 What is your source of information for farming? (1) Radio..... (2) NGO..... (3)Extension officers..... (4) Co-operative..... (5) Other.....

9.5 What is your source of information for marketing? (1) Radio..... (2) NGO..... (3)Extension officers..... (4) Co-operative..... (5) Other.....



31. Do you always receive your money the day the buyer promised you? 1=Yes 2 =No
32. Do you have a fixed number of farmers who deliver their vegetables to you after every Harvest? 1 =Yes 2= No
33. If yes, for how long have you been buying from them? .....
34. On what factor(s) does the price you are willing to pay the farmers depend?  
1=on the price I receive from my buyer 2= on the quality the farmer delivers 3= on the Costs I have to make 4 =something else, namely í í í í í
35. Do you know if the farmers you buy from keep records of the pesticides and fertilizers they used the last two years? 1 =Yes 2= No 3= some of them
36. If yes, for how long do they keep those records? 1= for one season 2 =for a year 3= for two years 4= other, namely í í í í í í í . 5 =I do not know