FACTORS INFLUENCING HORTICULTURAL PRODUCTION IN KENYA: A CASE OF FARMERS SPONSORED BY NON-GOVERNMENTAL ORGANIZATIONS IN MURANGA COUNTY, KENYA

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DECLARATION

This research project report is my original work and has not been submitted for the award of any degree in any other university or institution of higher learning.

Signature…….…. Date……..……..

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L50/77882/2015

This research project report has been submitted for examination with my approval as the university supervisor.

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DEDICATION

This research project is dedicated to my loving mother Florence Wambui and two sisters Elizabeth Mwangi and Ruth Mwangi who have given me eminence support through this study.

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ACRONYMS AND ABBREVIATIONS

ADC :	Agricultural Development Corporation
CBO :	Community Based Organization
GDP :	Gross Domestic Product
ICARDA :	International Centre for Agricultural Research in the Dry Areas
IFO :	International Finance Organization
NGO :	Non Governmental Organization
UNDP :	United Nations Development Programme
USAID :	United States Agency for International Development

ABSTRACT

This study assessed the factors influencing horticultural production in Kenya with respect to farmers sponsored by Non-Governmental Organizations (NGOs) in Muranga County. This study was guided by the following specific objectives; To establish how training programs offered by NGOs influence horticultural produce for farmers in Muranga County, To examine how financial support by NGOs influence horticultural produce for farmers in Muranga County, To analyze how market information provided by NGOs influence horticultural produce for farmers in Muranga County and to determine how horticultural production technology promoted by NGOs influence horticultural produce for farmers in Muranga County. A cross-sectional research design was used to carry this study in Murang'a County. This study targeted NGO officials and collaborating farmers in Muranga County. Simple random sampling was used to select participants from a sample size of 230 respondents. A pilot test was administered to 10% of the study sample size. Questionnaires, interview guides and observation schedules were used to collect primary data. The analyses were done using descriptive analysis and the results presented in tables. Study findings showed that training programs, financial support, market information and horticultural production technology influenced horticultural production. Therefore, this study concluded that training programs, market information and horticultural production technology significantly influenced the quality and quantity of horticultural produce. This study recommended for NGOs sponsoring farmers to improve horticultural production through mechanization promotion, avail dynamic market information system, develop alternative budgetary sources and finally to develop comprehensive training programs through holistic approach.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The importance of agriculture both in our current and future world cannot be underscored. The availability of food has always been a central preoccupation of mankind. Despite a doubling of the global population during the past four decades, farmers have produced sufficient food to allow average capita food intake to grow gradually (Dixon et al., 2001). Concerned with the rising numbers in the world population, there is consensus that going forward farmers must produce more food per unit of land, water and agrochemicals (Giovannucci et al., 2012). It is important to recognize that in developing countries, even though much poorer than the even the urban poor, it is the small rural farmers who produce much of the food for these countries. It is therefore prudent to ensure this section of small-scale farmers' challenges and problems are confronted and addressed in order to deal with poverty and hunger. Dixon et al. (2001) notes that investment priorities and policies must take into account the immense diversity of opportunities and problems facing these small-scale farmers.

Enhancement of horticultural produce must focus on quality & increased production, while at the same time emphasizing on the need for sustainable practices and effectively linking the farmers to markets both locally and internationally. Several development organizations and Non-Governmental Organizations have committed themselves to help meet farmers' needs. After the 1996 World Food Summit, NGOs have continued to respond to food security issues by taking increasingly rights-based and participatory approaches (Bailey, 2007). The growing power of large scale farmers involved in agribusiness and the decline of small scale farmers requires participatory approach and mass mobilization to change. Governments especially in developing nations have continued to prioritize other areas like health provision and creation of infrastructure thereby decreasing investment in agricultural sector. This move was expected to lead to growth and increased activity in the agricultural sectors by the private players; on the contrary, this action has hit negatively on farmers including in the horticulture sectors

forcing NGOs to intervene. Horticultural production can contribute to a less vulnerable, more diverse rural economy that provides opportunities to women and men and improves their livelihoods (ICARDA, 2003).

In spite of the fact that Africa is relatively wealthy with vast natural resources, small scale farmers especially in the rural environs in most developing nations still experience incidences of hunger and poverty. Almost all rural households depend directly or indirectly on agriculture, and given the sector's large contribution to the overall economy, it might seem obvious that agriculture should be a key sector in development. However, while agriculture-led growth has played an important role in reducing poverty and transforming the economies of many Asian countries, Africa is yet to realize such gains (Diao et al., 2011). In many African countries, only agriculture has sufficient scale to increase economic growth significantly over the foreseeable future (Diao et al., 2006). Diao et al. in their findings go on to indicate that agricultural growth is also more effective at reducing poverty, including in countries that may have the potential for industrial growth driven by rich national resources.

In Kenya, horticultural crops have been grown for both domestic and export markets. The large-scale export-oriented horticulture farms, cultivating fruits, flowers and vegetables, were by and large established in the 1980s. Horticultural production is the second most important foreign exchange earner in the agricultural sector in Kenya after tea (Swinnen & Maertens, 2007). UNDP (2015) while handing over farmer training centre to Muranga county government reiterated that agriculture was a key driver for poverty reduction. In order to participate in expanding export markets, farmers need support in enhancing their ability to adapt to increasing requirements of traceability, quality management and compliance with emerging standards. More research is needed to understand how smallholders can overcome these barriers (Ulrich, 2014). It is through addressing these barriers that NGOs can enhance horticultural produce and contribute to more sustainable development in the horticulture and overall livelihoods. Additionally, small scale farmers are cushioned and the gap in their bargaining power with the large scale commercial farmers reduced. Ongeri (2014) in his findings noted that Kenya has a high horticultural farming potential in many regions and should be supported in terms of collaborative

efforts by both national and county governments. It is a sector which has the potential to provide employment opportunities especially to the majority rural poor. The sector can also be a good source of food self-sufficiency at the local and national levels and enhance income earnings for the farmers which will improve their economic and social wellbeing with positive bearing on local economic development.

1.2 Statement of the Problem

Agriculture remains the second largest contributor to Kenya's Gross Domestic Product (GDP) with 30.2%, 2014; Tea, coffee cultivation and horticultural production are the main growth sectors and two most valuable of all Kenya's exports (World Bank, 2009). Despite the development of horticultural export sector in the country being led by the private sector, that is, the large scale farmers commanding commercial production (Ministry of Agriculture, 2010), majority of horticultural crops are still produced by small scale farmers contributing approximately 50% to 60% of total production. Most of these small scale farmers are driven mainly by self-sufficiency as opposed to commercialization. Several NGOs have cropped up to try offer clear strategic and policy measures with the aim of impacting on the level of horticultural production largely among small scale farmers.

While rich farmers in progressive areas will continue to make efforts to increase agricultural production through modern technologies and innovative inputs developed in the private sector, small scale farmers depending on rain-fed production and 'backward' techniques will depend on the public sector research and development institutions to help them to improve agricultural productivity, with low investment in agricultural inputs (Hegde, 2006). Across the past 4 decades, NGOs have increasingly positioned themselves as major players in social, economic and environmental affairs suggesting myriad interventions to support horticultural farmers in registering improved production and increased incomes; including instituting collaborations and roles within the public sectors. In order to propel the capacity of horticultural producing farmers' in economic development, evidences related to the successes and or challenges of these NGOs interventions and strategies needs to be established. It is against this backdrop that this

research study seeks to explore the four selected strategies by NGOs namely: training programs, financial support, market information provided and promotion of horticultural production technology have influenced horticultural production for farmers in Muranga County.

1.3 Purpose of the Study

The purpose of this study was to assess the factors influencing horticultural production in Kenya with respect to farmers sponsored by NGOs in Muranga County.

1.4 Objectives of the Study

The study was guided by the following objectives;

i. To establish how training programs offered by NGOs influence horticultural production for farmers in Muranga County

ii. To examine how financial support by NGOs influence horticultural production for farmers in Muranga County

iii. To establish how market information provided by NGOs influence horticultural production for farmers in Muranga County

iv. To determine how horticultural production technology promoted by NGOs influence horticultural production for farmers in Muranga County

1.5 Research Questions

i. To what extent do trainings programs offered by NGOs influence horticultural production for farmers in Muranga County?

ii. How does financial support by NGOs influence horticultural production for farmers in Muranga County?

iii. How does market information provided by NGOs influence horticultural production for farmers in Muranga County?

iv. How does horticultural production technology promoted by NGOs influence horticultural production for farmers in Muranga County?

1.6 Significance of the Study

A recent study carried out by Fintrac & USAID (2015) has indicated a decline in Kenya's Global market share of horticulture. It is therefore hoped that researchers, academics in the field of horticulture, policy makers, NGOs, governments and agribusiness populace will find the conclusions and recommendations of this study beneficial. Further, improving or enhancing horticultural production can provide significant income to the farmers both locally and internationally while providing the much needed employment to the country citizens.

This study was also significant in adding to existing knowledge on the factors influencing horticultural production with regards to Kenya. NGO's and Community Based Organizations (CBO) workers working directly with Muranga county horticulturists would also have access to this project study report hence improving their capacity to engage in policy-making, planning and formulation of development strategies.

1.7 Delimitation of the Study

The study assessed the factors influencing horticultural production for farmers with regards to farmers sponsored by NGOs in Muranga County. This research was done among selected farmers and NGOs in Muranga County. This research project commenced from June 2016 and ended in October 2016. The study was limited to horticultural producing farmers sponsored by NGOs operating within Muranga County.

1.8 Limitations of the Study

Although this study also examines on other factors influencing horticultural production in various countries, its scope is limited to horticultural producing farmers sponsored by NGOs in Muranga County. Lack of cooperation from the respondents might be a limitation as respondents may shy away from divulging their farm information. The

researcher will address this by elaborating the purpose of this research study while also assuring the respondents of ethical considerations and confidentiality.

There may be difficulty in accessing vast literature regarding the study due to insufficient research carried in this field particularly in Muranga's case. New knowledge will be ensured through inclusion of emerging literature; complemented with theoretical review of older literature. The researcher also visited many different collaborating government and agricultural agencies, libraries or repositories and websites to get the right literature concerning the study.

1.9 Assumptions of the Study

The study assumes that all the respondents are aware of the four selected strategies implemented by various NGOs in Muranga to influence horticultural production and thus will provide true perceptions and opinions regarding the same.

1.10 Definition of Significant Terms

Community Based Organization: Is used to refer to public or private non-profit organizations with almost similar NGO associated values but emphasis its' focus on issues of the community from which it draws its members.

Financial Support: In this study, financial support is used to refer to financial resources or backing provided by NGO's to the farmers either directly in monetary form or indirectly (subsidies & waivers)

Horticultural production technology: this is the technique of providing favourable environment and artificial climatic conditions to plants including processing of food harvest scientifically with the aim of optimizing costs, minimizing input and maintaining a steady production.

Horticultural Production: this is the art and science of growing flowers, fruits, vegetables, herbs and shrubs; also used to refer to horticultural farming within this context.

Market Information: this generally refers to market price information, and may also include some information on quantities, buyers, marketing channels, quality standards et al.

Non-Governmental Organization: this refers to self-governing, private not-for-profit organizations that are geared towards improving the quality of life of deliberating targeting the remote, disadvantaged and vulnerable persons. They can range from small informal groups to large formal agencies and take different roles across and within the society.

NGO Sponsored Farmers': this refers to the horticultural producing farmers that enjoy or derive monetary funding, services, products or other benefits either directly or indirectly from one or more NGOs with the aim of enhancing horticultural production.

Training Programs: these are programs designed and trained by NGOs or collaborating partners to impart specific skills on horticultural farmers through hands on experience and guidance in order to improve productivity and general farmers welfare.

1.11 Summary of Introduction

This chapter highlights on the background of the study, statement of the problem, objectives of the study, research questions, and significance of the study, limitations, assumptions and definition of terms used in the study

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CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this chapter, the researcher reviews available literature related to determinants of enhancing horticultural produce for farmers with respect to the Non-Governmental Organizations.

2.2 Horticultural Production in Kenya

Tigchelaar & Foley (1991) define horticulture as the art of growing flowers, fruits, vegetables, trees, and shrubs, resulting in the development of the minds and emotions of individuals, the enrichment and health of communities, and the integration of the garden in the breadth of modern civilization. According to Janick (1972), horticulture in its present concept is the branch of agriculture concerned with intensively cultured plants directly used by man for food, for medicinal purposes, or for esthetic gratification. Horticulture is divided into three main sectors, these include; fruit growing, market growing – vegetables and herbs - and ornamental cultivation or floriculture.

Horticulture practice and horticultural production can contribute to a less vulnerable, more diverse rural economy that provides opportunities to women and men and improves their livelihoods. Horticultural crops and their wild relatives play a fundamental role in the ecosystem rehabilitation and provision of sustainable agriculture (ICARDA, 2003). Similarly, Muendo & Tschirley (2004) assert that Kenya's horticultural sector has received a great deal of attention over the past decade due to the rapid and sustained growth of its exports to Europe contributing to increased rural incomes and reduced rural poverty in Kenya. Horticulture plays an important role in the employment sector in the rural areas often providing a source of income to the less educated citizens a characteristic of the rural population. Besides, horticulture provides high-quality food for people and also offers aesthetic pleasure improving psychological well-being. Ali (2003) establishes a strong relationship between horticultural production and overall socio-

economic development; Horticulture encourages agricultural business development in the rural economy and generates employment and income.

Maintaining the safety and quality of produce regardless of the targeted export market remains the same (Kader & Rolle, 2004). The criteria for post-harvest needs, the selection of post-harvest technologies should be customized according to the appropriate situation and context. To further solve post-harvest challenges that might impact on the quality and quantity of horticultural produce, Kader & Rolle stresses the importance of cooperation and effective communication among the research and extension farmers. To amplify this, the Horticultural Research Institute (HRI) with its headquarters in Muranga County conducts research in horticultural crops disseminating appropriate information and technology to farmers directly and indirectly through NGOs/CBOs.

2.2.1 Training Programs and Horticultural Production

Training and capacity building programmes plays a vital role in the development of any sector. Likewise, horticultural training programs targeting farmers help develop entrepreneurial skills and enable farmers to adapt to changing markets beyond the life of the NGOs/CBOs intervention. Murshed-E-Jahan & Pemsl (2011) on their study on Bangladeshi small farmers concluded that building the capacity of farmers through training is more valuable than the provision of financial support in terms of raising production and income. However, similarly studies on effectiveness of training for farmers showed that not all programmers meet success as most failures of programmes in the developing countries are attributed to the tendency of excessively concentrating on a particular technology transfer rather than a broader spectrum of farmer empowerment including knowledge disseminations (Oreszczyn, & Carr, 2010).

Noor & Dola (2011) in their findings suggested that generally training intervention provided was seen as imperative, timely and brought forth positive impact to the farmers. Even though it was difficult to measure and quantify immediate impact, the evidence they gathered implied that majority farmers considered themselves as better farm managers after undergoing trainings. For instance, TechnoServe in their project implementation in Ghana went beyond providing the technology and technical assistance. This is because it

was recognized that entrepreneurial skills in the communities were weak, and that group development activities and financial and business training (including linkages to formal credit and extension services) were necessary. Bockett (1999) in his study findings for TechnoServe and Oil palm processing in Ghana indicated that integrated training and support package provided by TechnoServe clearly contributed to the sustainable adoption and management of the oil processing enterprises.

To realize maximum positive results in training programs, academicians suggest that only qualified and competent person be engaged for trainings. Organizations that undertake group training and strengthening should assess the performance of individual groups beforehand to identify general group weaknesses and strengths. Stringfellow et al. (1997) studied farmer co-operative enterprises and their findings highlight the importance of not over-estimating group capacities, and the need for long-term involvement in building group capacities. This is because failure of training programs can be associated to other factors rather than the on the training process or activities per se. Additionally the training process should be further enhanced through demonstration of on-farm trails and continuous technical support through the NGOs extension officers or line department's staff (Ahmad et al., 2007).

Away from tradition, specialist NGOs are increasingly providing skills and training in agriculture at a cost. Such organizations develop their in-house training materials and skillfully select a cadre of professional trainers in respective fields to facilitate the training programmes. These pools of trainers are mostly active in horticultural related activities coordinating market studies, production technology and trade among others. Jeans (1998) notes that this strategy helps NGOs and CBOs with limited funding to reach a wider audience arguing that charging a fee increases the proportion of trainees who actually make effective use of their training. The entrepreneur, making the decision to invest money and time in training, is in effect making a risk assessment. Finally, the large-scale effects of training solutions are not immediately visible as farmers incorporate whatever skills & knowledge they have gathered into practice. However, farmer training creates individuals/groups with sustainable knowledge base that can be passed on to

future generations as soon as the improved technologies and techniques are put into actual practice.

2.2.2 Financial Support and Horticultural Production

Agriculture remains the main economic activity and employs the majority of the people in most low income countries. Globally, there are approximately 450 million households whose main activity is agriculture (IFC, 2014). Farmers particularly those in low income countries face a number of barriers among them limited access to finance. The World Bank (2014) states that despite agriculture being a key economic activity employing about 55% of the population in developing countries, only 1% of bank lending is channeled to agricultural sector.

The producers herein farmers and the traders both require capital to sustain and enhance produce. Rural populations, however, are much more dependent on informal sources of finance including loans from family and friends, the local moneylender, and rotating or accumulating savings and credit associations (Gordon, 2000). Poor farmers face different barriers in their quest to access credit especially from the formal sector. Gordon further notes that women even face more problems in obtaining credit and in some cases are only allowed to borrow in the names of their husbands. Farmers groups and NGOs often recognize a lack of credit as a critical constraint to the development of new initiatives and many seek to remedy this through credit interventions (Kindness & Gordon, 2001). This is because an approach that seeks to use formal commercial channels may take much longer to develop and may place the intended target group at a disadvantage relative to other members of the community.

NGOs banking on their considerable expertise, experiences and networks have introduced a raft of alternative methods to cushion the poor farmers financially. These include coordinating agricultural schemes, setting up micro-finance, farmer cooperatives, out grower schemes and inventory credits. The cost of providing financial services to the rural poor is high because the rural poor are located in remote areas, want to borrow small amounts, are often illiterate, lack experience of banks, and lack collateral, all of which necessitate the development of tailored approaches (Gordon, 2000). Critiques

however warn that the success of these financial alternatives hinge on careful research, planning and appropriate commercial linkages.

Besides direct monetary support, Stringfellow et al. (1997) argue that group enterprises are more likely to succeed when based on joint marketing rather than joint management/ownership of assets, because the latter requires more complex skills and experience. NGOs not only bring this essential complex skills required by these groups on the table but also provides both group and individual farmers with necessary knowledge and skills. Through existing or newly formed groups, NGOs are able to leverage lower transaction costs and bargaining power between the farmers and the traders thus improving revenues. Additionally, credit organizations favour group loans where pooled resources provide the necessary down-payment; this helps the farmers overcome problems of larger investment needed in processing technologies, storage facilities, transport among other activities (Kindness & Gordon, 2001).

From the years 1960's through to 1980's many African countries, including Kenya, Tanzania, Malawi, Zimbabwe and Zambia pursued large scale universal subsidy programmes (Dorward, 2009). Baltzer & Hansen (2011) in their study of subsidies in sub-Saharan Africa assert that agricultural input use in this region is very low compared to international standards and the hope is that subsidies may induce farmers to adopt the use of inputs thus increasing agricultural productivity. Consequently, NGO have also adopted the use of subsidies especially to small holder and poor farmers in order to foster horticultural produce. Agricultural scholars demand that for subsidy programmes to remain efficient and effective, clear beneficiaries targeting criteria should be enforced and adhered to void of political interference and favoritism.

2.2.3 Market Information and Horticultural Production

Many NGOs target the rural poor, whose livelihoods are generally focused on primary agriculture or trade, processing and services linked to the agricultural sector. Market information services usually involve the regular collection of commodity prices from major markets and supply conditions, processing and storing them, and disseminating the information to different stakeholders using one or more channels (Staatz et al., 2011).

The ability of those rural communities to access remunerative markets is a critical determinant of incomes and well-being (Kindness & Gordon, 2001). Agricultural professional and scholars have both proposed myriad of approaches to empower and equip the rural farmer practicing agricultural activities in the developing countries. Among the raft of mechanisms suggested, improving the marketing system (Roy, 2012) plays a great role in ensuring the farmers realize utmost benefits from their produce. Marketing information equips the farmer with the knowledge to devise marketing strategy, improve quality of farm produce, plan business pitch and bargain with different parties. According to Kleih et al. (2006) reliable market information may also help the farmers to decide on where to sell to, when to sell, who to sell to and also plan their production levels. Above all, market information enables the horticultural farmers to be aware of the types and quality of produce sought for internationally, regionally and even nationally thereby enhancing the quality and quantity of their produce.

Similarly, lack of market information and inadequate market access has led to low returns of agricultural produce especially to small holder farmers (Eskola, 2005). Whereas this study focuses on enhancing horticultural produce for farmers in Muranga County, the importance of availability of market information cannot be underscored. Magesa et al. (2014) in their study 'Agricultural market information services in developing Countries' reported that farmers who lacked market information failed to negotiate better prices for their produce thus ended up losing much of their profit to middlemen and intermediaries who were better equipped with market information. Additionally, lack of proper infrastructure, for instance, transport network also discouraged small scale farmers from travelling long distances to seek for better prices.

Provision of Market Information approach provides insights that are important for the development of horticultural agricultural exports in the developing countries. Policies aimed at promoting non-traditional agricultural production must focus not only on the growers, but also on the exporters and on marketing information & channels (Barrett et al., 1999). This strategy demonstrates that enhancing of horticultural produce must be integrated with market information knowledge in order for the small scale farmers to withstand competition from their large scale counterparts and make profits. Binns et al.,

(1999) assert that success in the fresh vegetables chain depends on meeting - and exceeding - the exacting requirements of major customers in export markets, and that there is little scope for exporters who lack the investment capabilities to ensure a consistent, quality product that complies with regulatory requirements to participate in the market. Evidently, timely and accurate information is important to all the stakeholders in the horticultural marketing chain, that is, farmers, suppliers, traders, transporters and even credit providers. It is therefore important for Non-Governmental Organizations' to sustain and encourage flow and dissemination of market information to and even within farmers themselves; this should be carried out collaboratively with existing private and government initiatives in order to realize utmost benefit in the horticultural sector.

2.2.4 Horticultural production technology and Horticultural Production

Agriculture being a global practice exploits resources faster leading to imbalance in the environment in form of soil erosion, pollutions, wildlife shifts among others. Hutchins (2013) asserts that agricultural practices are undeniably "unnatural", regardless of whether the production is a one square meter vegetable garden in Tokyo or a one million hectare rubber tree plantation in Malaysia. Credible arguments have been advanced to suggest that production of food via high-yield agriculture techniques can meet the nutrition requirements of the global population (Avery, 1995). Ndungu et al., (2005) in their study 'the role of non-governmental organizations in extension' published that the development and uptake of new agricultural technologies would clearly benefit from a closer collaboration of existing research institutes and NGOs in the study area.

Several farmers especially in developing countries lack up-to-date information and technology know-how on how to grow food efficiently and economically. Further, small-scale farming households in remote rural communities generally find that they operate in markets comprising many producers of undifferentiated products leading to stiff price competition and low profit margins. Rosegrant & Cline (2003) argue that improving farmers' knowledge in new techniques and technologies, in addition to providing them with any physical resources necessary for implementation, can dramatically increase the farmers' level of productivity. Access to processing technology can provide new market

opportunities – by reducing perishability or adding value in other ways (Kindness & Gordon, 2001).

Agriculturists and other scientists have suggested a large number of technologies/measures to develop agriculture. This includes use of improved seeds, chemical fertilizers, modern machinery, integrated pest management, and contacts with extensions agents. These technologies have been introduced and used from the last three decades but in spite of all this most of the developing counties have failed to achieve the desired goals of the development (Ahmad, 2007). Increasing number of NGOs in the agricultural development opt to introduce new technology at the same time train the farmers to ensure utilization. Prasad (1994) in his findings argued that training remains an important mechanism for the transfer of technology and improvement human skills in agriculture.

Utilization of food production technologies including investing in gender-sensitive technology can have significant impact of farmers' efficiency spanning water use, waste management, soil management, fertilizer application and energy use; all leading to a more productive farm. Technologies such as motorized equipment, modified housing for animals and biotechnology, green houses, integrated pest management, farm management information systems among others allow for improvement in agriculture. Overally, improved technology has allowed farmers to feed more people and requires only a few people to work on farms in order to feed the masses. Through the use of technology, each farmer is able to feed 155 people today, compared to 1940, when one farmer could feed only 19 people (Prax, 2010).

2.2.5 Enhancing Horticultural Production

Measures to enhance agricultural activities especially within the rural set up has been emphasized by academicians in agriculture and is associated with direct impact on rural growth by improving rural income, livelihoods and even increasing government revenue. Improved agricultural activity is the principal route to reducing poverty and improving livelihoods in developing countries (Magesa et al., 2014). Over the past years NGOs have become progressively more involved in development assistance, at every level. The shift

from a relief and welfare focus has come about partly in an attempt to address the underlying causes of some of those man-made disasters or to limit the negative consequences of the natural disasters at which they assisted (Kindness & Gordon, 2001).

To successfully enhance horticultural production and ensure high-quality horticulture products; It is imperative for NGOs/CBOs in collaboration with farmers to consider all aspects of production process from field to market. To market successfully, farmers need to produce and sell what is in demand, at a profit. Often existing markets could be accessible to farmers (either on their own or through linkages with traders), but marketing is constrained by the low volumes or poor quality of farmers' crops; Agricultural Development Corporation ADC (1988). This is because government extension services in most countries in sub-Saharan Africa are below capacity and where almost sufficient are under-resourced. NGOs consequently have to assume this crucial role in facilitating and providing relevant extension services required by the farmers in order to produce good qualities and great quantities. For instance, when introducing new products or production technologies; specialized or vocational training has to be provided to farmers to satisfy a new niche market or a specific quality-conscious export market.

Increasing and changing consumer demands for quality in countries and continents like Europe continue to pose a set of challenges to the Kenyan smallholder horticulturists who are succeeding in producing export quality market. Researchers, development practitioners, and governments are concerned that these changes in international supply chains for horticultural and other high-value agricultural products will make it increasingly difficult for smallholders to maintain their position in this trade (Dolan & Sutherland, 2002). Moreover, Kenya's horticultural export sector as a whole faces competition from other African countries such as Cote d'Ivoire, Morocco, Zimbabwe, South Africa and Cameroon. Muendo & Tschirley (2004) in their study recommend that to expand domestic, regional and international market for Kenyan horticultural produce, it is prudent to integrate smallholder farmers into profitable supply chain to satisfy the markets demands and improve quality of horticultural produce; these strategy may aid the nation to earn more exports.

2.3 Conceptual Framework

A conceptual framework provides a visual or written product that explains both in graphical and written form the variables under study and the presumed relationship among them (Miles & Huberman, 1994). The conceptual framework displaying the relationship of the variables is as shown in Figure 2.1.

Conceptual Framework

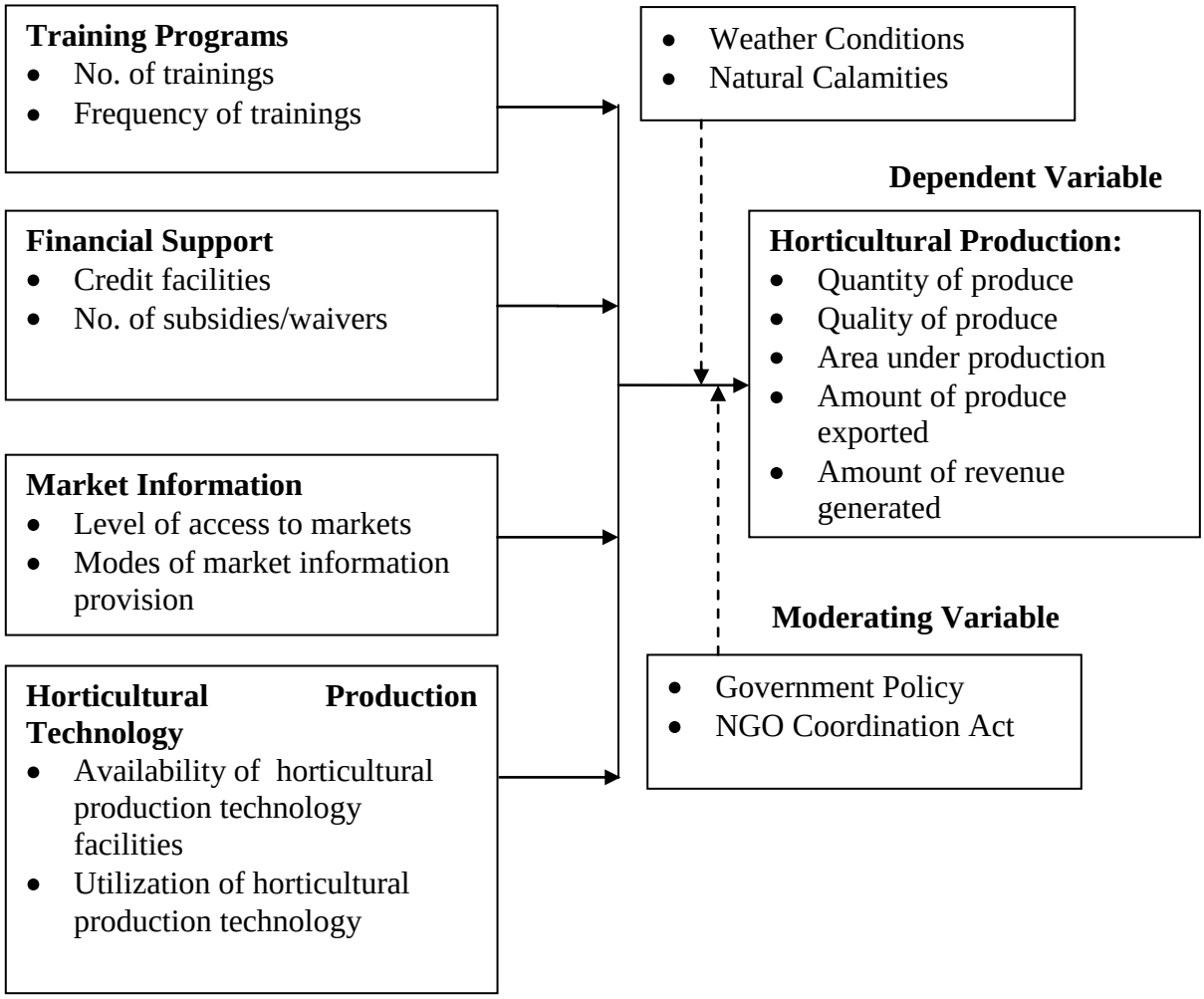

Fig 2.1 Conceptual Framework

2.4 Research Gap

Despite several researchers undertaking studies on enhancement of horticultural produce in both the developed world and sub-Saharan Africa, less is still known regarding the role of NGOs on how they impact on the determinants of enhancing horticultural production. Table 2.1 highlights previous studies, their findings and knowledge gap related to horticultural produce enhancement.

Table 2.1: Research Gap

Author	Study Title	Findings	Knowledge Gap
Madisa et al. (2012)	Analysis of Horticultural Production Trends in Botswana	Famers need to be trained on good management of crops so that productivity can increase with increase in area planted to horticultural crops	There is no quantification that training will lead to increase in productivity Success is based purely on perceptions
Dijkstra & Magori (1994)	Horticultural Production and Marketing in Kenya. Part 3: Taita Taveta District.	Horticultural sub-sector in Taita Taveta, is a major supplier of income, employment and food, but has to cope with various production and marketing constraints.	No specific determinant of enhancing horticultural produce exhaustively studied Tomatoes and cabbages are the only available horticultural crops in the study location

2.5 Summary of Literature Review

This chapter highlights and discusses the various determinants of enhancing horticultural produce and production for farmers with respect to NGOs operating in Muranga County. Horticulture and horticultural produce is discussed, followed by a review of the study variables; training programs, financial support, market information, Horticultural production technology and enhancing horticultural produce. A review of relevant literature portrays a worthwhile and favourable picture of NGOs activities in the agricultural sector. In spite of this, several research studies voice various gaps in the implementation processes and procedures adopted by NGOs. Additionally, it was noted that NGOs implement various strategies to enhance production however can barely pin-point the strengths and weaknesses of each strategy as they are mostly executed concurrently. This research study sets out to assess the determinants of enhancing horticultural produce for farmers, independently analysing the strengths and weaknesses of each variable.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights on the research methodology used for this study and is divided into different sub-topics, namely, research design, target population, sampling, sample size, research instruments, validity & reliability of the instruments, piloting, data collection and methods of data analysis.

3.2 Research Design

The researcher adopted descriptive research. Cross-sectional studies are also descriptive in nature and are not costly to undertake. A descriptive research design often produces clear, specific and measurable descriptions of the phenomenon or condition in question (Grimes & Schultz, 2002). This design does not also require a lot of time, hence it's applicability in this study.

A cross-sectional research design allowed the researcher to assess the factors affecting horticultural production for NGOs sponsored farmers across in Muranga horticultural sector at a specific point in time.

3.3 Target Population

The target population of this study consists of NGOs and individual farmers who actively engage in horticultural production in Muranga County. This study specifically targeted all horticultural NGOs' with respect, to NGOs and collaborating individual farmers in Murang'a County. According to Muranga County Development Office, there are a total of 37 NGOs with horticultural focussed activities supporting a total of 2272 horticultural producing farmers.

3.4 Sampling Procedure

The study adopted cluster sampling to select the sample for the study. These clusters comprise of NGO officials and collaborating farmers.

Mugenda & Mugenda (2003) assert that a sample size of 10% of the target population is adequate and conforms to statistical provisions. A sample was then chose based on this as shown in Table 3.1.

Table 3.1: Population under Study

Departments	Target population	Sample Size
NGO Officials'	37	3
Collaborating Farmers'	2272	227
Total		**230**

3.4.1 Sampling Technique

Simple random sampling was applied to pick respondents from each cluster. This is because this sampling method gave each respondent an equal opportunity of being chosen, that is, every respondent had an equal probability of being selected to form the final sample.

3.5 Pilot Testing

A pilot study to test the research instruments was carried out in Limuru, Kiambu county. Questionnaires and interview guide were administered to 1 NGO official and 22 collaborating farmers in Muranga County. These participants were not included in the final study. Participant views and thoughts including feedback from the interviewers were captured. This feedback formed the final research instrument to be used for data collection. According to Burns & Groove (2005), pilot studies provides a fast and efficient way to find out effectiveness of research instruments; this is done by pre-testing it with a section of respondents whose characteristics are similar to those in the actual study.

3.5.1 Validity of the Research Instruments

Orodho & Kombo (2002) define validity as the ability to which a data instruments measures what it is supposed to measure.

This study applied content validity. This is because content validity helps address the extent to which the elements within our measurement procedure are relevant and a representative of the construct that they will be used to measure (Haynes et al., 1995). Research instruments used in this study were submitted to horticultural experts, and scholars to seek their input on the relevance and validity of the questions before actual data collection begun. The researcher then integrated these inputs to enhance the study research instruments.

3.5.2 Reliability of the Research Instruments

Reliability of an instrument is the measure of degree to which a research yields consistent results or data after repeated trials (Mugenda & Mugenda, 2003).

In order to test the reliability of the research instruments, split-half methodology was applied. The researcher divided the questions into sets of odd and even numbers. The sum of scores for all even and odd numbers from each respondent was then computed. Microsoft Excel was used to calculate and carry out a correlation coefficient test on the even and odd sets of questions giving correlation coefficient ($r=0.56977$). Since only half the numbers of items are used in split-half methodology, the reliability coefficient is reduced. Therefore, to obtain a better estimate, we applied the spearman-brown correction ($p=0.72593$). This result confirms reliability of our research instruments as it shows a high positive association co-efficient.

3.6 Data Collection Procedure

Permission to conduct this research study was sought from the University of Nairobi; thereby initiating data collection. Further approval was sought from the National Council for Science, Technology and Innovation (NCST); this is to obtain the research permit to

carry out data collection. The data was collected between the months of Sepember and October2016 by the researcher.

In order to facilitate smooth flow of the process, the researcher held prior consultations with the selected NGOs in Muranga County for introduction purposes and in-depth explanations on objectives of the research study. Interview guides were administered to the NGO officials in their respective offices. The researcher then accompanied the NGO representatives or NGO extension officers in their field activities to understand individual farmer perspective by administering the questionnaires including filling the observation schedule.

3.7 Research Instruments

The researcher used a combination of techniques to collect the final study data. These included; collection of primary and secondary data. Primary data was collected through the use of a structured questionnaire, interview guides, and observation schedules. Secondary data was obtained from related research studies on factors influencing horticultural production, review of NGO records, NGO reports, peer reviewed journals and articles.

In order to obtain a complete overview and understanding, the questionnaire were divided into distinct sections as guided by the research questions. These questionnaires were administered to individual farmers working hand in hand with the NGOs sampled. Interview guides were administered to NGO officials; this enabled the researcher to comprehensively assess the aforementioned variables in the study and also allow for probing the respondents further. The researcher designed data sheets for observation criteria. Farm operations, documents and physical site were scrutinized to obtain additional data using observation schedules.

3.8 Data Analysis Techniques

Initial steps included editing the filled questionnaires and responses from the research instruments in readiness for analysis and also to minimize errors and incompleteness in the collected data. Responses were then categorized and coded appropriately and entered

into Statistical Package for Social Sciences (SPSS). Descriptive statistics such as means, percentages and frequencies were used thereby transforming the raw data into figures and tables for interpretation (Mugenda & Mugenda, 1999) for clear understanding.

The researcher applied thematic analysis to analyse qualitative data & responses obtained from the interview guides and observation schedules. Information related to research study objectives and questions was identified, classified and consequently used to develop a summary of qualitative results.

3.9 Ethical Considerations

The purpose of this study was explained to all the respondents including in their native language before seeking their consent. The respondents' opinions, responses and views were treated with utmost respect. The researcher also encouraged voluntary participation from the respondents and informed them of their right to withdraw at any stage of the interview. To ensure confidentiality and anonymity of the respondents', the researcher did not require any form of identification. All steps were taken to assure the participants privacy while also ensuring information collected was used only to fulfill the purpose of this research study.

3.10 Operationalization of Variables

Table 3.2: Operationalization of Variables

Objectives	Types of Variables	Indicators	Measurement Scale	Data Collection Instruments	Analysis Tools of Analysis
To establish how training programs offered by NGOs enhance horticultural produce for farmers in Muranga County	Independent – training programs	No. of trainings	Ordinal	Questionnaire Interviews	Mean Frequency Correlation
		Frequency of Training	Ordinal	Questionnaire Interviews	Mean Frequency Correlation
	Dependent – Enhance horticultural produce	Enhancement of horticultural produce	Nominal Ordinal	Questionnaire Interviews Observation	Mean Median Frequency Correlation
To examine how financial support by NGOs enhance horticultural produce for farmers in Muranga County	Independent – financial support	Budgetary allocations	Ordinal Ratio	Questionnaire Interviews Document Review	Mean Frequency Correlation
		Credit facilities	Ordinal	Questionnaire Interviews Document Review	Mean
		No. of subsidies	Ordinal	Questionnaire Interviews	Mean Standard Deviation
To determine how market information provided by NGOs enhance horticultural produce for farmers in Muranga County	Independent – market information	Level of access to markets	Ordinal	Questionnaire Interviews Observation	Mean Correlation
		Modes of market information provision	Nominal	Questionnaire Interviews	Mode Frequency
To determine how horticultural production technology promoted by NGOs enhance horticultural produce for farmers in Muranga County	Independent – horticultural production technology	Availability of horticultural production technology facilities	Ordinal	Questionnaire Interviews Observation	Mean
		% utilization of horticultural production technology	Ordinal	Questionnaire Interviews Observation	Mean Frequency

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents results arising from the analysis of data collected using questionnaire, interview guide and observation schedule. The data collected was analyzed using descriptive statistical methods for each of the research questions namely; to what extent do trainings programs offered by NGOs influence horticultural production for farmers in Muranga County?, how does financial support by NGOs influence horticultural production for farmers in Muranga County?, how does market information provided by NGOs influence horticultural production for farmers in Muranga County?, and how does horticultural production technology promoted by NGOs influence horticultural production for farmers in Muranga County?.

The findings are presented in presented in tabular summaries, their implications discussed and interpreted.

4.2 Response Rate

Table 4.1 presents the number of questionnaires that were completed by the collaborating farmers and NGO officials.

Table 4.1: Response Rate

Description	Frequency	Percentage
Returned	188	82.82
Not Returned	39	17.18
Total	**227**	**100.0**

A total of 227 respondents were sampled and questionnaires administered. However, only 188 of the targeted farmers sponsored by NGO in Muranga County duly completed the questionnaires representing 82.82%. According to Mugenda & Mugenda (2003), this percentage is considered adequate for analytical purposes.

Additionally, interview guides were administered to 3 targeted NGO officials whom all participated. The data collected is analyzed and presented in subsequent topic in this chapter.

4.3 Demographic Characteristics of Respondents

The first section of the questionnaire administered to NGO sponsored farmers consisted of general information questions to capture the demographic characteristics. The findings are presented in different categories consisting gender, age, and level of education.

4.3.1 Gender of the Respondents

Table 4.2: Gender of the Respondents'

Gender	Frequency	Percent
Male	61	32.45
Female	127	67.55
Total	**188**	**100**

Table 4.2 shows the gender distribution among the respondents. Findings show a relatively high number of females (67.55%) as compared with that of recorded male (32.45%) numbers. This implies that there were more women farmers in the population sampled.

4.3.2 Age of the Respondents

The second question in the demographics section sought to identify the ages of the respondents and the findings are shown in Table 4.3.

Table 4.3: Grouped Ages of the Respondents'

Grouped Ages	Frequency	Percent	Cumulative Percent
<20yrs	4	2.13	2.13
20-29yrs	17	9.04	11.17
30-39yrs	29	15.43	26.60
40-49yrs	58	30.85	57.45
50-59yrs	52	27.66	85.11
60-69yrs	18	9.57	94.68
70yrs>	10	5.32	100.00
Total	**188**	**100.00**	

Respondents aged between 40 years to 49 years recorded the highest percentage at 30.85% forming the larger part of those interviewed. The least groups were those below the age of 20 years (2.13%) and those respondents above 70 years (5.32%). From the data it is evident that a greater percentage of farmers in Muranga County are above the age of 40 years (73.40%); an indication that farming is likely regarded in this county as a reserve for the aging population. However, this is an assumption that needs further studies and analysis.

Table 4.4: Respondents' Level of Education

Level of Education	Frequency	Percent	Cumulative Percent
Primary Certificate	42	22.34	22.34
High School Certificate	61	32.45	54.79
Diploma Certificate	46	24.47	79.26
Degree Certificate	22	11.70	90.96
Master Certificate	13	6.91	97.87
PhD Certificate	4	2.13	100.00
Total	**188**	**100.00**	

Table 4.4 shows the highest level of education attained by the respondents. Most of the farmers interviewed had atleast completed high school, 32.45%. This was followed by those who had diploma certificate at 24.47%, closely followed by those who had completed primary level. Only 4 (2.13%) respondents out of the 188 surveyed had PhD certification.

4.4 Presentation of Findings

The purpose of this study was to assess the factors influencing horticultural production in Kenya with respect to farmers sponsored by NGOs in Muranga County.

The preceding items on the other sections of the questionnaire sought to establish whether NGO farmers in Muranga County engaged in other income related activities, their major purpose for farming, and finally duration of time (in years) in farming as a whole versus duration of time in farming horticultural produce. Findings are shown in Table 4.5, Table 4.6 and Table 4.7 consecutively. This information will further help this study in searching for meaning, implications and drawing conclusions on the overall study findings with respect to the research questions.

Table 4.5: Engages in Other Income Related Activities

Engages in other activity	Frequency	Percent
Yes	140	74.47
No	48	25.53
Total	**188**	**100.0**

Table 4.5 shows the number of farmers that engage in other income related activities aside from farming. A total of 140 respondents (74.47%) indicated that they at least had other part time activities they undertook. Only 25.53% engaged in farming activities full-time.

Table 4.6: Major Purpose of Farming

Purpose	Frequency	Percent
Subsistence	17	9.04
Commercial	39	20.75
Commercial & Subsistence	132	70.21
Total	**188**	**100.0**

When asked their main reasons for engaging in farming, the farmers responded as shown in Table 4.6. Only a small number of farmers representing 9.04% engaged in farming solely for subsistence. Majority engaged in farming activities both for commercial and subsistence purposes (70.21%) followed by those who practiced farming solely for commercial purposes (20.75%).

Table 4.7: Cross-tabulation of Years in Farming and Years in Farming Horticultural Produce

		Complete years spent in farming horticultural produce						***Total***
Complete years spent in farming as a whole		**<1yr**	**1-3yrs**	**4-6yrs**	**7-9yrs**	**10-12yrs**	**>12yrs**	
<1yr	Count	9	0	0	0	0	0	**9**
		100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**4.78%**
1-3yrs	Count	4	6	0	0	0	0	**10**
		40.00%	60.00%	0.00%	0.00%	0.00%	0.00%	**5.32%**
4-6yrs	Count	0	4	25	0	0	0	**29**
		0.00%	13.79%	86.21%	0.00%	0.00%	0.00%	**15.43%**
7-9yrs	Count	1	1	6	19	0	0	**27**
		3.70%	3.70%	22.23%	70.37%	0.00%	0.00%	**14.36%**
10-12yrs	Count	1	0	5	13	28	0	**47**
		2.13%	0.00%	10.64%	27.66%	59.57%	0.00%	**25.00%**
>12yrs	Count	0	1	3	7	20	35	**66**
		0.00%	1.52%	4.55%	10.61%	30.30%	53.02%	**35.11%**

Total	**Count**	**15**	**12**	**39**	**39**	**48**	**35**	**188**
		7.98%	**6.38%**	**20.74%**	**20.74%**	**25.54%**	**18.62%**	**100.00%**

Table 4.7 shows a cross tabulation of years in farming and years spent in farming horticultural produce. This was done by asking the farmers first, how long they been engaging in general farming activities, then, the second question was posed to them to distinguish how many of those years had been spent solely in farming horticultural produce. More than half of the farmers surveyed had atleast spent more than 3 years both in farming as a whole (89.9%) and in farming horticultural produce (85.64%). These results imply that most of these respondents have relative experience in farming horticultural produce, hence deeming their subsequent responses as reliable.

The four factors influencing horticultural production are addressed, analysed and their findings discussed in each subsequent sub-topic. These factors form the independent variables namely; training programs, financial support, market information and horticultural production technology and the dependent variable of the study namely horticultural production.

4.4.1 Training Programs and Horticultural Production

The first objective of this research study was to establish how training programs offered by NGOs influence horticultural production for farmers in Muranga County. This objective was assessed by asking the respondents to respond to a series of questions. The results are displayed in Table 4.8, Table 4.9, Table 4.10 and Table 4.11 followed by detailed discussion under each table.

Table 4.8: Training Attendance

Description	Frequency	Percent (Out of Total Respondents)
No. of farmers who've heard/know about NGO training programs	158	84.04
No. of farmers attending NGO training programs	106	56.38

Even though 84.04% of the farmers heard or knew about the training programs carried out by different NGO's in Muranga County, only 56.38% were attending or had attended such trainings in the sampled population.

Table 4.9: Reason for not Attending NGO Trainings

Reason given	Frequency	Percent	Valid Percent
I do not qualify	5	2.66	9.62
I have the skills offered	10	5.32	19.23
I do not have time	7	3.72	13.46
Bias in selection of Trainees	23	12.23	44.23
I am not interested	7	3.72	13.46
Total	**52**	**27.65**	**100.00**

This research study then sought to understand the reason for not attending NGO trainings and the responses were recorded as shown in Table 4.9. A larger percentage of those who knew about the training programs offered by NGOs and were not attending attributed to bias in selection of trainees (44.23%). Another group (19.23%) felt they had the skills that were being trained on. A similar number of 7 respondents out of the 52 not attending gave lack of time and lack of interest each, 13.46%.

Table 4.10: Areas Trained on NGO Training Programs

Areas Trained	Frequency	Percent	Valid Percent
Record Keeping	11	5.85	10.38
Modern Farming Techniques	17	9.03	16.03
Entrepreneurship	8	4.26	7.55
Processing & Storing Produce	19	10.11	17.92
Marketing	28	14.89	26.42
Harvesting & Post harvesting	12	6.38	11.32
Finance/Accounting	11	5.85	10.38
Total	**106**	**56.38**	**100.00**

Table 4.10 reveals findings on the different training sessions attended by respondents in the sample population. Marketing was the most attended area of training representing 26.42% of the responses. This is understandable considering most respondents engaged in farming activities for both commercial and subsistence purpose and thus they would like to know how to and where to market their produce.

Table 4.11: Benefits of Attending NGO Trainings

Benefits	Frequency	Percent	Valid Percent	Cumulative Percent
Increase in Quality of Produce	21	11.17	19.81	19.81
Increases in Crop yield & Production	36	19.15	33.96	53.77
Increase in Revenue & Income	23	12.23	21.70	75.47
None	26	13.83	24.53	100.00
Total	106	56.38	100.00	

Respondents were asked to check against some of the benefits they experienced as a result of attending NGO trainings with results shown in Table 4.11. The most popular benefits as recorded by the respondents were increase in crop yield and production (33.96%), increase in revenue and income (21.70%) and increase in quality of produce

(19.81%). Farmers who found trainings programs as beneficial totalled 75.47% of those surveyed indicating confidence in training programs offered by NGOs in Muranga County.

4.4.2 Financial Support and Horticultural Production

The second objective of this study was to examine how financial support by NGOs influence horticultural production for farmers in Muranga County. The study findings are presented followed by detailed discussions.

Table 4.12: Source of Financial Support

Source	Frequency	Percent
Self/Savings	60	31.92
Friends	2	1.06
NGO affiliated	54	28.72
Banking Institutions	9	4.79
Cooperatives/Sacco	63	33.51
Total	**188**	**100.00**

The respondents were asked to indicate their source of financial support. Findings reveal that majority of the respondents received financial support from cooperatives (33.51%) followed closely by individual savings (31.92%). NGO financial support was ranked as third most attractive source of financial support at 28.72%. Only few of the respondents opted for finance from banking institutions and friends representing 4.79% and 1.06% consecutively. This result can be assumed to be the norm as obtaining financing from most banking institutions in Kenya including Muranga County involve several bureaucratic processes & back checks; a factor that might not be so attractive to small scale & middle scale farmers.

Table 4.13: Subsidies Facilitated by NGO

Subsidy/Waiver received on	Frequency	Percent	Valid Percent
Fertilizer	26	13.83	25.49
Farm tools	15	7.98	14.71
Heavy farm machinery	7	3.72	6.86
Seeds	25	13.30	24.51
Insecticides	10	5.32	9.81
Processing of Produce	6	3.19	5.88
Packaging of Produce	8	4.26	7.84
Storage of Produce	5	2.66	4.90
Total	**102**	**54.26**	**100.00**

Financial support to farmers is also provided through waivers or subsidies with regards to accessing farm products, services and support services. Aware of this fact, the study research posed the question to the respondents; 54.26% of the farmers in the sample population admitted to receiving waiver/subsidy. Majority of farmers recorded obtaining waivers when purchasing fertilizer (25.49%) and seeds (24.51%).

4.4.3 Market Information and Horticultural Production

The third objective of this study was to establish how market information provided by NGOs influence horticultural production for farmers in Muranga County. The study findings are presented in Table 4.14 and Table 4.15 followed by detailed discussions.

Table 4.14: Importance of Market Information to Farmers

Statement	Frequency	Percent
Know when to sell	35	18.62
Know where to sell	39	20.75
Know whom to sell to	26	13.83
Improve quality of my produce	32	17.02
Increase quantity of my produce	23	12.23
Allow me to negotiate better prices	33	17.55
Total	**188**	**100.00**

Majority of the sampled NGO sponsored farmers perceived market information provided by NGOs to be most important especially towards selling their produce. Consequently most respondents wanted to know where to sell (20.75%), when to sell (18.62), whom to sell to (13.83%) including to allow them to negotiate better prices (17.55%). These results corresponds with the major purpose the farmers provided for engaging in farming activities, that is, commercial and subsistence.

Table 4.15: NGO Provided Market Platform

Description	Frequency	Percent (Out of Total Respondents)
No. of farmer who know about NGO provided Market platform	95	50.53
No. of farmers who rate NGO provided Market platform location as convenient	85	45.21

The respondents were then asked to respond on NGO provided market platforms, a total of 95 out of 188 respondents were aware about the NGO provided market platforms however only 85 respondents rated the NGO provided market platform location as convenient. A section of farmers attributed their dissatisfaction with the provided market location to the following reasons; existence of unscrupulous middle men, low number of

customers to sell to and hours of operations were also unsatisfactory among others. It is important to build on existing marketing channels, rather than establishing new ones. At the same time, strategies that are more facilitative and less interventionist are likely to be more sustainable (Kindness & Gordon, 2001).

4.4.4 Horticultural production technology and Horticultural Production

The fourth objective of this research study was to determine how horticultural production technology promoted by NGOs influence horticultural production for farmers in Muranga County. This objective was assessed by asking the respondents to respond to a series of questions. The results are displayed in Table 4.16, Table 4.17, Table 4.18 and Table 4.19 followed by detailed discussion under each table.

Table 4.16: Mode of Farming Used

Mode of Farming	Frequency	Percent
Manpower Only	88	46.81
Machinery Only	5	2.66
Both Manpower and Machinery	95	50.53
Total	**188**	**100.00**

This study also set to establish the different modes of farming applied by the NGO sponsored farmers in Muranga County. This was paramount in establishing to what extent NGOs had promoted horticultural production technology. Findings revealed that most farmers preferred to use both manpower and machinery techniques (50.53%). On the other hand, 46.81% of the farmers used manpower only and 2.66% used machinery only.

Table 4.17: Modern Farming Technologies accessed by Farmers

Technology	Frequency	Percent
Production & Processing technique	38	20.21
Storage Technology	51	27.13
Harvesting Technology	41	21.81
None	58	30.85
Total	**188**	**100.00**

A total of 130 farmers were atleast accessing one or more modern farming technologies for use in their farm activities. This represented 69.15% of the farmers' sampled population.

Table 4.18: Owner of Farming Technologies Used

Owner	Frequency	Percent	Valid Percent
Myself	13	9.04	13.08
NGO	26	18.09	26.15
Co-owned (Group)	22	15.42	22.31
Co-owned (NGO & Myself)	19	13.30	19.23
Co-owned (Financial Institution & Myself)	4	2.66	3.85
Rented/Leased	15	10.64	15.38
Total	**100**	**69.15**	**100.00**

Further, the research study was interested in the composition of ownership of the farming technologies and thus posed the question to the respondents. Table 4.18 findings reveal only few farmers own farming technologies (13.08); several of the farming technologies are either co-owned, leased or belongs to third parties, in this case, NGO. Muranga being a rural-side county, this result is probable as modern farming technologies in such areas are predominantly owned by large scale farmers - rural elites - owing to their ability to access finance and more developed entrepreneurial skill.

Table 4.19: Equipment Breakdown and Duration taken to repair Equipment

		Duration it takes to repair equipment back to operational status				
Who caters for cost of repair or breakdown of equipment		**One Week**	**Fortnight**	**One Month**	**More than a Month**	***Total***
Self	Count	5	9	8	5	**27**
	%	17.14%	34.29%	28.57%	20.00%	**26.92%**
Group	Count	6	3	7	9	**25**
	%	24.24%	12.12%	27.27%	36.36%	**25.39%**
NGO	Count	17	13	9	8	**48**
	%	35.48%	27.42%	19.36%	17.74%	**47.69%**
Total	**Count**	**28**	**25**	**24**	**23**	**100**
	%	**27.69%**	**25.38%**	**23.85%**	**23.08%**	**100.00%**

Table 4.19 shows a cross-tabulation of who caters for equipment breakdown versus how long it takes for an actual repair to be made. NGO topped the list as they were the only group able to make the most number of repairs within a week (35.48%) of reporting breakdowns or faults. Farming tech equipment is only as good and beneficial when in operational status. A breakdown of equipment would result in several hours/days productivity loss, manpower loss or even lead to post-harvest loses. It is therefore paramount that farm technology or equipment be repaired as fast as possible.

4.4.5 Enhancing Horticultural Production

Finally, the last section of the questionnaire also sought the opinion of the respondents regarding the dependent variable of this research study. The findings are shown in Table 4.20 and Table 4.21.

Table 4.20: Productivity Trend over the Past Years

Productivity trend	Frequency	Percent
Increasing	49	26.06
Increasing greatly	37	19.68
Decreasing	24	12.77
Decreasing greatly	33	17.55
Not Changed	45	23.94
Total	188	100.00

According to the findings, when the respondents were asked about the productivity trend in the last five years, 45.74% of the NGO sponsored farmers in Muranga County expressed an increasing productivity trend from their farms. Similarly, another group of the respondents representing 23.94% felt that there was no change.

Table 4.21: Factors Influencing Productivity Trend

Statement	Frequency	Percent	Valid Percent
NGO Intervention	57	30.32	39.86
Individual Input	11	5.85	7.69
Weather	15	7.98	10.49
Diseases/Pests	23	12.23	16.09
Capital/Resources	28	14.89	19.58
Traditional Farming methods	9	4.79	6.29
Total	**143**	**76.06**	**100.00**

In line with this research study purpose, to assess the factors influencing horticultural production in Kenya with respect to farmers sponsored by NGOs in Muranga County, the respondents who recorded changes in productivity trend were further queried on some of the factors they perceived as influencing the productivity trend. The findings are documented in Table 4.21. NGO Intervention, in this case, is conceived as that which includes the four factors under this research study recorded for 57 out of 143 respondents

or 39.86%. Interventions instituted by NGO can therefore be argued as an influencer to productivity trend by either leading to an increase or decrease in final production.

4.4.6 Correlation

Table 4.22 shows the Spearman's correlation carried out the independent and dependent variables.

Table 4.22: Spearman's rho Correlation

Variables		Training Programs	Financial Support	Market Information	Horticultural Production Technology
Enhancing Horticultural Production	Correlation Coefficient	.377*	.177	-.039	.445*
	Sig. (2-tailed)	.000	.000	.000	.000
	N	188	188	188	188

***. Correlation is significant at the 0.01 level (2-tailed).**

According to the findings, the two independent variables – training programs and horticultural production technology – indicate a positive correlation value of ($r = 0.377$, p-value <0.001 and $r = 0.445$, p-value <0.001). This implies that as training programs and horticultural production technology significantly increase, there will be a significant increase in horticultural production as well.

4.5. Responses from NGO Officials

In order to comprehensively study the raw data collected using interview guides, thematic analysis technique was applied to analyse cross-sections of the data. A total of 3 NGO officials were interviewed.

The findings revealed that most of NGOs in the sampled population were involved in a variety of activities all targeted at Muranga County horticultural farmers with the purpose of assisting them enhance their production. Among the mentioned activities included

trainings, financing, provision of marketing platforms and horticultural production technology. One respondent noted that the trainings were mostly offered to farmer groups through face-to-face interactions and were facilitated by NGO extension officers. Moreover, two of the respondents cited that NGO sponsorship programmes and its related activities ensured that most of the small scale farmers remained engaged productively in income generating activities thus realizing improved farm revenues. According to one of the respondents, through NGO support farmers were able to access new market opportunities owing to reduced perishability of their farm produce, a fact he credited to provision of household-scale food processing technologies.

Finally, when asked what ways NGOs could facilitate enhancement of horticultural produce to farmers, the respondents highlighted on some of the challenges that they felt influenced horticultural production negatively. These included; lack of sufficient NGO personnel with specific attention to Extension and field officers to continually assist horticultural produce farmers in their everyday farm activities. One respondent cited a period in 2014 where they had lacked an extension officer for a long period leading to delays in evaluation of farm status and performance. Over and above that, all the respondents cited insufficient finance as a setback noting that at times farmers had to do without appropriate fertilizers as the NGO still sourced or waited to receive funding from their donors.

4.5.2 Observation Schedule Data

This research study also applied observation schedules to collect data on the list of crops planted, farming practices, approximate size of farm, and available farm equipment. Naturalistic observation technique was used to collect the data and the results are captured in the subsequent paragraph.

The most planted horticultural crops by majority of farmers whom were vegetables and fruits. The vegetables mainly cultivated included cabbages, tomatoes, kales, spinach, and French beans among others while the fruits included avocadoes, bananas, mangoes oranges and passion fruits. Only a few of the farmers cultivated flowers; it is also important to note that the larger section of the flower farmers had large tracts of land and

their major purpose for farming was for commercial purposes. A great number of the farms visited for this research study purposes used both manpower and machinery to carry out their farming activities. Several farm equipment and horticultural production technology such as post-harvest equipment, drip irrigation technology, different farm tractors, and different small-scale processing equipment were also observed.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the findings focusing on the research questions, conclusions, recommendation and suggestions of areas for further research.

5.2 Summary of Findings

Most respondents stated that they not only engaged in agricultural activities for commercial purposes but also for subsistence recording 70.21%. Additionally, 74.47% of the collaborating farmers cited that they were also engaged in other income related activities besides horticultural farming.

The first objective of this study was to establish how training programs offered by NGOs influence horticultural production for farmers in Muranga County. Majority of collaborating farmers who were or had attended these training programmes recorded that they found the trainings beneficial (75.47%).

Second, this study set out to examine how financial support by NGOs influence horticultural production for farmers in Muranga County; Findings depict NGOs as a rather unpopular source for financial support. Consequently, collaborating farmers indicated that they were also provided waivers/subsidies with regards to assessing farm equipment or services; a total of 54.26% had benefitted from this initiative.

As per the third objective, to establish how market information provided by NGOs influence horticultural production for farmers in Muranga County; results indicated that majority of the farmers perceived market information as very important in selling their produce. NGO provided marketing platforms were recorded as convenient places to sell market or learn about other farmers. However, a section of the farmers were dissatisfied with the provided NGO marketing platform owing to the following reasons; existence of unscrupulous middle men, low number of customers to sell to and hours of operations were also unsatisfactory among others.

The fourth and last objective of this research study to determine how horticultural production technology promoted by NGOs influence horticultural production for farmers in Muranga County findings showed that only a few farmers representing 2.66% were using only mechanised systems for horticultural production. In the same breadth, 50.53% preferred to use a combination of manpower and mechanized systems to carry out their face whereas 46.81% used only manpower to produce. A total of 130 or 69.15% farmers were having access to atleast one or more modern farming technologies instituted by the NGOs.

5.3 Conclusions

Ali (2003) in his findings established a strong relationship between horticultural production and overall socio- economic development; asserting that horticultural production encouraged agricultural business development especially in the rural economy and generates employment and income for the residents. It can thus be concluded that NGO sponsored horticultural farmers in Muranga County are well aware of this fact and hence also included commercial aspect as their end plan

Firstly, research findings have shown that there are significant benefits to attending NGO trainings programs in terms of increase in quality of produce, increase in crop yield and increase in revenue

Secondly, while Kenya remains a developing country, poverty remains widespread even though not in a uniform manner. Farmers - most of them located in the rural areas - will continue to face a myriad barriers key among them being limited accessing to financing. As echoed by sections of farmers in this study, obtaining financing from banking institutions is cumbersome as it involves several bureaucratic processes and back & forth checks locking out the small-scale and middle scale farmers. The farmers are thus restricted to personal savings, friends, cooperatives and NGOs as their next sources of financing.

The farmers however caution of biasness in processes and difficulties in accessing these alternatives in turn concluding financial support provided by NGOs as rather an unpopular option for farmers in Muranga County.

Thirdly, the importance of providing market information cannot be underscored. Efficient market information provision can be shown to have positive benefits for farmers, traders and policymakers. Market information remains an important factor in enhancing the quality and quantity of produce; essentially, influencing horticultural production among NGO sponsored farmers in Muranga County.

Lastly, improving farmers' knowledge in new techniques and technologies including providing them with physical resources necessary for implementation, can dramatically increase the farmers' level of productivity (Rosegrant & Cline, 2003). It is against such revelation that this research study set out to determine how horticultural production technology promoted by NGOs influence horticultural production for farmers in Muranga County.

5.4 Recommendations

This study makes the following recommendations in line with the objectives;

1. NGOs should develop comprehensive training programs that are holistic in approach vis-à-vis establish and laying out clear & transparent procedures for selecting trainees to benefit from training programs. This is because many farmers lamented about not having an opportunity to participate in the trainings owing to biasness; whether perceived or actual, this might prove detrimental to the NGOs overall image derailing their efforts in enhancing horticultural production.

2. Horticultural NGOs in Muranga County should take lead role in partnering with other like-minded institutions or even sponsors in order to expand and develop alternative budgetary sources that will be available for access by farmers. It is imperative that while instituting this strategy all stakeholders should be extensively consulted to avoid pitfalls and while identifying the areas that might work.

3. NGOs sponsoring horticultural farmers in Muranga County should strive to avail a dynamic market information system to the farmers that is competitive and continuously updated in line with the farmers expectations. Further, to encourage

adoption and regular use of this system, farmers should be sensitized appropriately.

4. As indicated in the study findings; the penetration of horticultural production technology remains very low. Therefore, this study recommends that NGOs sponsoring farmers in partnership with other relevant stakeholders should contribute to increase horticultural productivity through mechanization promotion. Additionally, ensure farmers have access to necessary and appropriate equipment for modern farming techniques.

5.5 Suggestions for Further Research

Continuous research is important in further assessing the factors influencing horticultural production especially for NGO sponsored farmers. This study therefore suggests the following areas for further research;

1. Analyse the drivers that influence farmers choice when settling for farming as a part-time activity as opposed to a full-time activity.
2. Identify factors motivating the aged population in taking up agricultural activities as opposed to their younger counterparts
3. Impact of NGOs agricultural programmes in enhancing farmers livelihoods

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APPENDICES

Appendix I: Letter of Introduction

University of Nairobi,

P. O. Box 30197 – 00100,

Nairobi.

Dear Respondent,

RE: LETTER OF INTRODUCTION

I am a student at the University of Nairobi currently working on my research project for a master's degree course in Project Planning and Management. As part of requirement for fulfilment of award of this degree, I am carrying out a research study. The purpose of this study is to assess the determinants of enhancing horticultural produce for farmers; a case of Non-Governmental Organizations in Muranga County.

I am kindly requesting you to fill that attached questionnaire as accurately as possible. Feel free to seek clarification for any part or whole of information you do not understand. I assure you that information given shall be treated with confidence and shall be used only for this research.

You will also be able to access the final findings, conclusions and recommendation of this study once it is finalized & approved on the university repository portal.

Your participation in this research study will be highly appreciated.

Yours Sincerely,

Jackline Mwangi

Appendix II: Questionnaire to farmers

FACTORS AFFECTING HORTICULTURAL PRODUCTIVITY IN KENYA: A CASE OF FARMERS SPONSORED BY NGOS IN MURANGA COUNTY.

Sub-County: _____ *Division:* _____

Please tick or mark appropriate category details

Section A: Demographic Data

1. Age bracket (years)

<20☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69☐ 70> ☐

2. Gender

☐ Female ☐ Male

3. Highest education qualification

☐ Primary Certificate ☐ High School Certificate

☐ Diploma Certificate ☐ Degree Certificate

☐ Master Certificate ☐ PhD Certificate

Others (specify): _____

4. Do you engage in any other income generating activity apart from farming?

☐ Yes ☐ No

5. The major purpose for my farm produce is

☐ Business/Commercial ☐ Food/Subsistence

☐ Both food & commercial Others (specify): _____

6. Complete years spent in farming

<1☐ 1-3 ☐ 4-6 ☐ 7-9 ☐ 10-12 ☐ 12> ☐

7. Complete years spent in farming horticultural produce

<1☐ 1-3 ☐ 4-6 ☐ 7-9 ☐ 10-12 ☐ 12> ☐

Section B: Training Programs and Enhancing Horticultural Produce

8. Have you heard of any NGO horticultural training programs in Muranga County?

☐ Yes ☐ No

9. Do you attend or receive training from any NGO?

☐ Yes ☐ No

10. If Q8 is Yes and Q9 is No, What is the reason for you not attending these training?

☐ I do not qualify ☐ I can't afford

☐ I have the skills offered ☐ I do not have time

☐ Bias in selection of trainees ☐ I am not interested

Others (specify): _____

11. If Q9 is yes, how often do you attend/receive training from NGO/NGO extension officers?

☐ Weekly ☐ Once every Two weeks

☐ Monthly ☐ Quarterly

☐ Semi-annually ☐ Yearly

Others (specify): _____

12. I have received the following training(s) from the NGO training programs

☐ Record-Keeping ☐ Modern farming techniques

☐ Entrepreneurship ☐ Processing & Storage of produce

☐ Marketing ☐ Harvesting & Post-harvesting techniques

☐ Finance/Accounting Others (specify): _____

13. To what extent has the training programs offered by NGOs helped you in farming?

☐ I have seen an increase in quality of produce

☐ I have seen an increase in crop yield and production since receiving training

☐ I have seen an increase in revenue/income as a result of applying knowledge and skills gained in NGO training programs

☐ None

Others (specify): _____

14. I think NGOs should

☐ Increase no. of trainings ☐ Decrease no. of training

☐ Revise/Update their trainings ☐ Continue trainings as currently offered

Others (specify): _____

Section C: Financial Support and Enhancing Horticultural Produce

15. Where do you get financial support

☐ Self/Other income ☐ Friends

☐ NGO affiliated ☐ Banking Institutions

☐ Cooperatives/Sacco Others (specify): _____

16. Do you get any NGO subsidy or waiver on farm related purchases?

☐ Yes ☐ No

17. If Q16 is yes, what farm related purchases attract a subsidy/waiver facilitated by the NGO?

☐ Fertilizer ☐ Farm tools

☐ Heavy farm machinery ☐ Seeds

☐ Insecticides ☐ Processing of produce

☐ Packaging of produce ☐ Storage of produce

Others (specify): _____

Section D: Market Information and Enhancing Horticultural Produce

18. I prefer to sell my produce

☐ Direct market (locally or internationally) ☐ Through NGO market channels

☐ Through middlemen/intermediaries ☐ Third party agencies

Others (specify): _____

19. Market information provided by NGO allow me to identify

☐ When to sell ☐ Where to sell

☐ Whom to sell to ☐ Improve quality of my produce

☐ Increase quantity I produce ☐ Allow me to negotiate for better prices

Others (specify): _____

20. Apart from NGO provided market information, what other sources do you use to obtain market information (tick more than one if applicable)

☐ Flier Adverts/Billboards ☐ Media (Radios/TV)

☐ Newspaper ☐ Internet

☐ Journals Others (specify): _____

21. NGOs have provided a platform/location for farmers to meet and sell their wares/products

☐ Yes ☐ No

22. The location of the market platform facilitated by NGO is convenient

☐ Yes ☐ No

23. If Q22 answer is no, please mark/tick one of the reasons below

☐ Hours of operation are not satisfying

☐ Road/transport network to location is poor

☐ Low number of customers to sell to

☐ Existence of unscrupulous middlemen/traders

Others (specify): _____

Section E: Horticultural production technology and Enhancing Horticultural Produce

24. What is the mode of farming you use in your farm frequently?

☐ Man power ☐ Machinery only

☐ Both man power & machinery Others (specify): _____

25. Please mark/tick against the following modern farming techniques/equipment that you use in your farm?

☐ Green house ☐ Drip Irrigation

☐ Sprinkler system ☐ Mechanical harvester

26. Who owns the equipment used in your farm

☐ Myself ☐ NGO

☐ Co-Owned (Group) ☐ Co-Owned (NGO & Myself)

☐ Co-Owned (Financial Institution & Myself) ☐ Rented/Leased

Others (specify): _____

27. I have access to the following modern farming technology

☐ Production & processing tech ☐ Storage technology

☐ Harvesting tech ☐ None

Others (specify): _____

28. How often do you carry out maintenance on your tech equipment

☐ Weekly ☐ Once every Two weeks

☐ Monthly ☐ Quarterly

☐ Semi-annually ☐ Yearly

Others (specify): _____

29. How often does you tech equipment breakdown

☐ Weekly ☐ Once every Two weeks

☐ Monthly ☐ Quarterly

☐ Semi-annually ☐ Yearly

Others (specify): _____

30. Who caters for the costs related to repair and break downs

☐ Self ☐ Group

☐ NGO Others (specify): _____

31. Approximately how long does it take to repair your tech equipment once a fault/failure is reported?

☐ 1 Week ☐ Fortnight

☐ 1 Month ☐ More than a month

Others (specify): _____

Section F: Enhancing Horticultural Produce

32. What has been the productivity trend in your farm over the past five years

☐ Increasing ☐ Increasing greatly

☐ Decreasing ☐ Decreasing greatly

☐ Not Changed Others (specify): _____

33. Follow up on Q32 (If answer is either increasing or decreasing), this trend is due to changes attributed to

☐ NGO intervention (training programs, financial support, market information, Horticultural production technology)

☐ Individual input (Investments, time, knowledge)

☐ Weather ☐ Diseases/Pests

☐ Capital/resources ☐ Traditional farming methods

Others (specify): _____

34. Do you have any further comments you would like to make regarding this survey?

_____

_____

_____

_____

Appendix III: Interview Guide to NGO officials

Interview Guide 1: Non-Governmental Organization Officials

FACTORS INFLUENCING HORTICULTURAL PRODUCTION IN KENYA: A CASE OF FARMERS SPONSORED BY NGOS IN MURANGA COUNTY.

The interviewer will carry out a brief introduction, explanation & respond to any arising questions regarding the research study before commencing the interview

NGO: _____ *Designation:* _____

Sub-County: _____ *Division:* _____

NGO Years in operation: _____

Official no. of years served in NGO: _____

Approx. time: 30Mins

Please respond to the following questions:

1. Please highlight to us your major horticultural activities in Muranga County *(Training methods used; financing; marketing & production techniques)*
2. How do you get into contact with partnering farmers/farmer groups? Explain why this strategy and not others? *(e.g. Phone, actual visit, village meetings, barazas)*
3. Please comment on the trend of budget allocated to horticultural produce over the past five years? What would you say about the impact of this trend?
4. How would you describe the farming technology/modern practices used by partnering farmers or groups? *(probe in relation to enhancement of horticultural produce)*
5. In your own opinion what can NGOs do or do more to enhance horticultural produce to farmers?

Appendix IV: Observation Schedule for the Interviewer

Observation: For farming practices & produce

The interviewer in consultation with the Extension Officer will visually observe & record existing farm produce, technology and equipment

Date: _____

1. List of Crops Planted

2. Farming practices (planting, fertilizing, pest control, cultivation & harvesting)

3. Size of farm (small-scale or large scale)

4. Available farm equipment