COMPARATIVE STUDY ON HIGH VALUE TRADITIONAL CROPS PRODUCTIVITY AMONG COMMON INTEREST GROUP AND NON-COMMON INTEREST GROUP SMALLHOLDER FARMERS IN MIWANI DIVISION, MUHORONI SUBCOUNTY, KENYA

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A Thesis Submitted to Graduate School in Partial Fulfillment for the Requirement

Of the Award of the Degree of Master of Science in Community

Studies and Extension of Egerton University

EGERTON UNIVERSITY

November, 2014

DECLARATION AND RECOMMENDATION

Declaration

I hereby declare that this is my original work and it has not been submitted for an award of a degree in this or any other University

Signature…… **Date……**

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EM21/2331/09

Recommendation

This thesis has been submitted for award of the degree ofMasters of Science in Community Studies and Extension with our approval as university supervisors.

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ACKNOWLEDGEMENT

I want to sincerely thank many people who contributed directly or indirectly towards the success of my study. I acknowledge my very able and dedicated Supervisors; Dr. C. Ngendo and Dr. A. Olubandwa who encouraged and assisted me in my endeavor to accomplish my work. May God continue to bless the works of your hands and grant you good health. To my colleagues, thanks for your contributions, moral support and readiness to share with me information whenever there was need. To my mum and my sons Kegan and Tom thanks immensely for the support, love and prayers which you continuously offered. I owe special debts to the entire staff in the department of Applied Community Development Studies and those from the Faculty of Education and Community Studies. My gratitude also goes to the CIG households and Ministry of Agriculture staff in Miwani and Nyando divisions who participated in the survey by giving information that forms the backbone of this work. Let nobody who participated in this study feel left out and so I want to assure you that I have all at heart.

ABSTRACT

Agriculture is the backbone of Kenyan economy contributing to both Gross Domestic Product (GDP) and export earnings. The Ministry of Agriculture plays a key role in bringing farmers together and educates them on food production practices through various approaches. The Common Interest Groups is one of the extension approaches where farmers with similar interests are brought together for the purpose of imparting technologies. One of the major production areas promoted by extension agents is High Value Traditional Crops (HVTCs). This study was necessary because promotion of the crops are done and for many years picked by farmers who form Common Interest Groups (CIGs) in Miwani division. While other farmers grow HVTCs individually, group formation is common among those farmers with similar interest. CIGformation has been consistentsince the initiation of CIG approachbut the reason for the consistency is not known. This raises question whether there is any difference in productivity of HVTCs among CIG and non CIG members hence the need for this study.The data generated may add to new knowledge and be used by development planners, policies makers to improve on CIG approach. This study was undertaken in Miwani division, Muhoroni Sub-County with purpose of comparing productivity of HVTCs among CIG and non CIG members. Guided by the theory of Symbolic Social Interaction, this study was conducted through cross-sectional survey research design on 120 respondents from 15 high value traditional crops CIGs in Miwani division and 120 non-CIGs in Nyando division selected through proportionate sampling and simple random sampling techniques. Data was collected by use of questionnaires and interview guide and analyzed through descriptive statistics to determine whether there was difference in productivity of HVTCs between CIG and non-CIG members. The study findings indicated difference between HVTCs CIG and non-CIG members characterized by increase in level of technical knowledge, yields, incomes and adoption of high value traditional crops. In conclusion, those in CIGs benefited more than non-CIG members by the virtue of being in CIGs and by them participating in CIG activities. The study recommends that, the approach should be part of the extension system but with some modifications in its implementation.

TABLE OF CONTENTS

Contents

List of Tables

List of Figures

Abbreviations and Acronyms

CIGs**:** Common Interest Groups

FA**:** Focal Area

FFS: Farmer Field Schools

GDP**:** Gross Domestic Product

GOK**:** Government of Kenya

HVTCs: High Value Traditional Crops

INTERPAKS**:** International Programs for Agricultural Knowledge Systems

MOA**:** Ministry of Agriculture

MOALF: Ministry of Agriculture, Livestock and Fisheries

NALEP**:** National Agriculture and Livestock Extension Program

NEP**:** National Extension Program

PRA**:** Participatory Rural Appraisal

T & V**:** Training and Visit

CHAPTER ONE
INTRODUCTION

1.1 Background Information

Globally, Agriculture extension plays a vital role in the economy through sharing and imparting agricultural knowledge and technologies with farmers. Also globally, half of the hungry people are smallholder farmers who are in the marginal areas and own less than two acres of land. The world food shortages can be eliminated by increasing food and agricultural production in both developed and developing countries. Worldwide, the attraction to smallholder farmers lies in the economic efficiency relative to large farms and the fact that they can create large amounts of productive employment. Improvement in production is needed because one person out of seven still suffers from chronic or acute hunger. International investment in high value traditional crops (HVTCs) in the past has been negligible even though they are critical for feeding world most disadvantaged regions as reported by International Program for Agriculture Systems (INTERPAKS,2006). HVTCs are crops such as cassava, sweet potatoes, sorghum, arrowroots and local vegetables are cheap to produce and can survive adverse conditions and their planting materials can be locally obtained.

High value traditional crops are crops that arevalued culturally, and are often adapted to harsh environments. They are nutritious and can grow in a wide range of climatic conditions, and are targets for food security in Kenya and other parts of the world. High value traditional crops currently cover 250 million hectares in developing countries and play an important role in regional and national food security because they can improve productive capacity of land. Smallholder farmers in the rural communities produce the bulk of the regional food requirements, yet their production system has many limitations including poor access to information on improved production technology. In Sub-Saharan Africa, high value traditional crops are more important than cash crops both in area and in their contribution to the diet (INTERPAKS, 2010).

In Kenya,smallholder farmers produce most of their own food and also contribute about 68% of the nation's total marketed output. As a result, agricultural production is often for subsistence and productivity levels tend to stagnate or sometimes decline. In Kenya,Agriculture extension

plays an important role in enhancing farmers' collective capacitiesto improve orphan crops productivity. Agriculture is a key sector for achieving economic advancement and poverty alleviation among Kenyans most of who are crops or livestock farmers. Most Kenyans derive their livelihoods from agriculture which is a base for economic growth, employment creation, and foreign exchange generation as recorded by Ministry of Agriculture (MOA, 2005). Agriculture growth is crucial to Kenya's economic and social development because it contributes about 26% and 27% Gross Domestic Product (GDP) through linkages with manufacturing, distribution and related sectors. Agriculture's contribution to GDP enhances food security and reduces poverty as compared to GDP originating outside agriculture. This is because agriculture directly contributes to over 24 percent of Kenya's GDP through manufacturing, distribution and service related sectors. Also very important is that agriculture sector employs over 80 percent of Kenya's workforce both directly and indirectly as indicated by Ministry of Agriculture, Livestock and Fisheries (MOALF) (2007). Agricultural extension service therefore is critical in the transformation of subsistence farming to more profitable agriculture through different approaches to enhance food security in Kenya.Agriculture is directly linked to poverty eradication, sustainable consumption and production of agricultural commodities.

Food is critical to the economic and social development to both smallholder and large scale farmers who struggle to improve on production. Majority of Kenyan farmers engage in production of cash crops and as a result ignore HVTCs which play an important role in feeding the world's population. This together with climate change, poor choice of crops and different extension approaches has resulted in complex production system. The crops produced and the approach used has manifested itself in many ways such as abandonment and low yields resulting in famine and hunger. Though the responsibility of improving agricultural productivity has been bestowed upon extension services, extension agents experience various constraints including financial constraints hence the need to develop and use a cost effective extension approach such as working through groups. The current diversification of needs and the reduced resources of the public extension system, led to a proliferation of alternative extension approaches (MOA, 2005)

One such approach in extension services is Common Interest Group (CIG) approach which aims at improving adoption of innovations and productivity based on a model of total human

development because members of all categories are fully involved in the process.

The aim of initiating CIG approach was to enable extension agents to reach as many farmers as possible at any given time and to enhance farmers' collective capacities to improve their economic and social status by increased productivity (MOA, 2001). Extension brings all farmers together to a learning point through promotion of opportunities in farming. One of the production areas being promoted by the MOA is High Value Traditional Crops because of their importance. Although the HVTCs are vital for the livelihoods of millions of resource poor persons and are locally important, they have received considerably less or no attention by public and private extension services because investments were centered in widely consumed crops that are traded internationally such as rice, coffee and wheat (Henry, 2005). High value traditional crops production in Kenya between the year 2002 and 2005 kept on changing by some crops increasing in production and acreages while for some there were decrease and increase as years went by. According to MOA (2006), sorghum actual production had been declining in some areas despite the great potential to produce the crop. The significant drop was attributed to poor weather conditions. As for local vegetables, there was a downward trend in hectare between 2004 and 2005.

Despite the downward trend in hectaresfor vegetables production as indicated,yields has been increasing in the subsequentyears because of tapped technology and much effort put by farmers. The members of HVTCs are expected to tap and acquire knowledge, technologies and skills delivered through the common interest group approach for productivity of HVTCs in Miwani division and nationally. CIGs in Miwani division have been in operation since the year 2002 and the number of interested farmers in HVTCs production has been consistently registered over the years (MOA, 2007). This made it necessary to compare adoption of HVTCs between CIG and non-CIG members. The reason for the study was to establish the difference in adoption of HVTCs between CIG and non-CIG members in Miwani division.

1.2 Statement of the Problem

The world food shortages can be eliminated by increasing food and agricultural production. This can be done through application of modern technology, common interest groups and reviving High Value Traditional crops(HVTCs). Since the initiation of the Common Interest Group(CIG)

approach in the year 2002, the Ministry of Agriculture's focus in Miwani division has been on promotion of high value traditional crops through CIGs. There was formation of HVTCs common interest groups in every promotion which indicated their interest in HVTCs.

Despite a lot of efforts put in promoting and formation of the HVTCs as means of increasing food production, it is not clear whether there is difference in productivity of HVTCs between CIG and non-CIGs members. Groups have been associated with fast spread effect, however comparison between common interest group and non-CIG members on productivity of high value traditional crops among smallholder farmers is not known, hence the need to conduct the study.

1.3 Purpose of the Study

The purpose of the study was to determinewhether there is difference in high value traditional crops productivity between CIG and non-CIG members in Miwani Division, Muhoroni Sub-County.

1.4 Objectives of the Study

The objectives of the study were to:

i. Determine the level of technical knowledge acquired on high value traditional crops production among CIG and non-CIG members in Miwani division.
ii. Asses adoption of high value traditional crops among CIG and non-CIG members in Miwani division.
iii. Establish the yields of highvalue traditional crops among CIG and non-CIG members in Miwani division.
iv. Determine the level of marketing of high value traditional crops among CIG and non-CIG members in Miwani division.
v. Describeperceptions of CIG members about the CIG approach on adoption ofhigh value traditional crops among CIG members in Miwani division.

1.5 Research Questions

i. What is the level of technical knowledge on HVTCs production between CIG and non-CIG members in Miwani division?

ii. What is the rate of adoption of HVTCs among CIG and non-CIG members in Miwani division?

iii. What are the yields of HVTCs among CIG and non-CIG members in Miwani division?

iv. What is the level of marketing of HVTCs among CIG and non-CIG members?

v. What is the perception of CIG members about CIG approach on adoption of HVTCs among CIG members in Miwani division?

1.6 Significance of the Study

The findings of the study may assist policy makers to review policies on interventions that can promote production of HVTCs. Development plannersmay use the findingsto put in place plans that would improve the CIG approach. Donors may also use the findings in formulating proper and sound strategies to improve the common interest group approach with the aim of increasing HVTCs production efficiency. The findings of the study may also add new knowledge to the existing common interest groups literature and as a reference material to help extension agents and general farmers to plan activities that use CIG approach more effectively.

1.7 Scope of the Study

The study was carried out in all the three locations of Miwani division namely; North East Kano, Ombeyi and Nyangoma in Miwani division (Now Masogo, Nyangoma and Ombeyi wards). The study covered CIG members in Miwani division and non-CIG members in Nyando division nowAwasi, Onjiko, Katolo and Kochogo Wards) who grow high value traditional crops (HVTCs) such as sweet potatoes, cassava, local vegetables, sorghum and arrow roots. The study investigated the influence of common interest group approach on HVTCs productivity in the context of adoption, yields, technical knowledge and marketing among smallholder farmers in Miwani division.

1.8 Assumptions

The assumptions were;

i) That all the sampled respondents will be within reach.

ii) That the sampled farmers would be willing to respond accordingly without holding answers.

1.9 Limitations

The following limitations were anticipated:

1. That study would be affected by poor road networks which would make the area inaccessible and slow data collection process. To collect data in the area, the researcher used motor bikes as means of transport while some areas, the researcher walked to the group members to collect data in time.

ii) That some of the respondents were illiterate and wouldnot able to give information on their own. For the illiterate, the researcher administered questionnaires through interviews.

1.10 Operational Definition terms

Definition of terms is a procedure whereby concepts are defined in terms of their operations as used in the study;for purposes of the study, the following terms were used:

Adoption: This is defined as the process through which farmers learn new technologies, perceive ideas, try the ideas in their farms, continue practicing and adopt the technology if its benefits are realized (Mael & Ashforth, 1995). For this study, adoption was where smallholder farmers who are CIG and non-CIG members were learn, accept,use and continue using production techniques on high value traditional crops by smallholder farmers who were members and non-members of CIGs.

Agricultural extension: This is a service or system which assists farmers through training and educational procedures to improve their farming techniques, increasing their production efficiency and incomes, hence bettering their standards of living (MOA, 2006).For this study, agriculture extension was the service received by farmers through CIGs.

Common interest group: This is defined as farmers with similar interests who come together to take an initiative of fulfilling their desired goals and objectives (MOA, 2001). For this study, this is a group of farmer's who have interest in high value traditional crops production.

Extension approaches: Defined as a style of managing extension system aimed at passing agricultural messages to farmers through interaction, to enable farmers improve their agricultural productivity and livelihoods (Gautam&Anderson,1999). The extension approach for this study is passing information through common interest groups on high value traditional crops.

Focal area: This is a unit of operation selected by Ministry of Agriculture based on a Location as a framework for delivery of extension services(MOA,2001). For this study, the focal area is where members of common interest groups are drawn.

High Value Traditional Crops: Defined as cheap to produce, resistant to drought and high nutritional value crops (INTERPAKS, 1996). For this study, the high value traditional crops are crops that met these criteria in Miwani and Nyando divisions.

Marketing: This is an activity which involves buying and selling of farm produce by farmers

and traders from the farm to the market (Malunga, 2007). For this study, it involves selling surplus high value traditional crops products through CIGs.

Marketing channels: These are ways through which farm produce are sold and bought as per available supply which involves market survey, prices of commodities and is matched with existing demand in the market (Krishworld, 2008). Marketing channels for this study were retail, wholesale, farm gate and through middlemen.

Productivity: This is the outcome of the efforts and involvement in production of any crop (Jurgon, Chuma & Connely, 2002). For this study, productivity is described in terms of yields and income of high value traditional crops as a result of membership in Common Interest Groups.

Smallholder farmers: Defined as farmers who ownsmall units of land of less than 5 acres for andare limited to farmon small scale for subsistence use (MOA, 2005). For this study, these are farmers who grow and produce high value traditional crops for both domestic and commercial purposes.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Common interest group (CIG) approach was introduced in Kenya in 2001 as an extension method aimed at improving adoption of innovation and productivity among smallholder farmers based on a model of total human development because members of all categories are fully involved in the process. This chapter describes literature in relation to the proposed area of study. The areas under review which were used to guide the researcher during the study were; extension services and previous approaches in extension, role of farmer groups in agricultural development, role of common interest group approach in extension service, high value traditional cropsadoption in relation to CIGs, role of groups in adoption of agricultural innovations, role of groups in marketing of agricultural productsand role of group composition in development.

2.2 Extension Services and Previous Approaches in Extension

Extension is an ongoing process of learning through which people get information and acquire knowledge and skills to improve their standards of living. Agricultural extension services aim at improving knowledge, change in attitude and behavior towards adoption of new technologies with the view of increasing and improving farmers' incomes and productivity on a sustainable basis. The role of the Ministry of Agriculture in realizing government goals is to formulate and monitor agricultural legislation and regulation policies geared towards training and educating farmers through extension services. This is to help raise farm productivity which has persistently remained low resulting into food insecurity. Extension generally aims at teaching rural people to raise their farm productivity to improve their level of living by their own efforts, through making proper use of the resources at their disposal in better systems of farming(Ministry of Agriculture, 2001).

Several extension approaches have been used by the Ministry of Agriculture to reach and educate farmers. These include; individual farm visit, Training and Visit (T&V), Catchment Area and Farmer Field Schools (FFS) among others. However, it is noted that most of the extension

approaches have resulted into ineffectiveness due to poor transfer of information, low adoption of technologies perceivedby farmers as ascribed by the Ministry of Agriculture resulting to low productivity, especially among smallholder farmers who are the majority (Jurgon, Chuma & Connely, 2002). Some approaches like Catchment area, recorded some successes in many parts of Kenya. Group approach was common where large scale farmers with common interests in dairy, tea and coffee among crops formed cooperatives through which they could sell their products. Common interest groups (CIGs) among smallholder farmers was initiated after food insecurity was experienced especially in marginal areas which have potential for traditional crops referred to as high value traditional crops crops(MOA,2001).

There are six distinct periods that have marked the evolvement of extension approaches used in Kenya. First being in the colonial days, when large scale farming was given more attention by the British settlers and farmers were to operate through cooperatives and unions.These large scale farmers mainly grew cash crops such as coffee, tea, sugarcane and keeping of dairy cattle The Ministry of Agriculture took over extension after independence, but there was no organized way of approaching farmers. Second, the Ministry of Agriculture from 1973, worked with individual large scale farmers and cooperatives. Provincial administration were involvedduring this period to enhance the economy of the country through farming (Evenson & Mwabu, 1998). By then orphan crops now referred to as HVTCs were still being grown by most smallholder farmers onindividual basis. Individual approach failed because not many farmers could be reached and extension agents were only able to cover small areas at any given time and therefore not many farmers could take advantage of innovations.

Third, Training and Visit according to Gautam and Anderson (1999) was initiated in 1983 under National Extension Programme I (NEP) which had an established chain for research and extension linkages. In T&V farmers were engaged in on-farm trainings and demonstrations by extension agents in selected farms. Farmers were trained on production of different crops depending on the area and what the farmer could afford to grow. For Miwani, farmers were trained on production of maize (Miwani divisional office, 1988). It is noted that Training and Visit was successful in terms of increase in agricultural production because of regular contact between the farmer and the frontline extension agents where farmers benefited from new

technologies to increase their farm productivity. The approach resulted into improved information dissemination to the contact farmers and those from around the farms. However, this was the period when farmers started shifting from traditional to exotic crops production and the approach was only geared towards working with contact farmers and not groups. T&V approach however, with its successes still proved ineffective because of lack of accountability and marginalization of farmers who were not within easy access to demonstration farms (World Bank, 1999). The Fourth was the catchment area approach which came into existence in 1994 under NEP II which was fully under operation in the soil and water conservation branch. The catchment approach used a wide area of coverage of about 200 farmers who trained and worked in groups. These farmers were mainly trained on soil conservation measures while other crops were grown alongside the conservation measures.The success of catchment group approach was the extensive adoption of soil conservation interventions done by farmers as stated by Bindlise and Evenson (1993). However there were shortcomings in that only a few individual farmers werecovered in a wide area and the approach only focused on soil conservation measures with little emphasis on crops production.

The Fifth was the Farmer Field Schools (FFS) group approach which was introduced in the year 2003 to initiate community action in solving community problems through groups was not different from the past approaches. Farmer Field Schools involved demonstrations carried out in small plots at various sites. According to a study done by Mogeni (2005), FFS only benefited those whose farms were used as demonstration plots. In these demonstration farms, a variety of crops were grown depending on what is suitable for the area.Although FFS used group approach, there were more failures as demonstration plots were situated at sites which could not be reached by many farmers easily and most of the group members would give up before the results were realized. The demonstration plots were small and could not be used to measure productivity of any crop grown. Further, the farmer groups were not formed according to interests of farmers in an area and so there were a lot of assumptions which led to low adoption. The common crops grown were maize and horticultural crops while orphan crops were rarely considered in the farmer field schools. Sixth, National Agriculture and Livestock Extension Programme (NALEP) phases I and II which were introduced in the year 2001 and 2006 respectively through CIGs and took off in line with the National Development Plans.

The key role of extension services in NALEP is to provide information that would trigger demand for technological opinions where extension agents recognize and encourage farmers in the focal area through CIG approach in order to improve agricultural productivity (MOA, 2007). This approach was preferred due to failures of the previous approaches where groups were educated and trained according to planned and formulated policies by the Ministry but without considering interests of farmers. NALEP used a Focal Area (FA) approach where members of CIGs were trained in various aspects and thereafter visited in their farms as demanded. NALEP was introduced to focus on poverty measures by empowering smallholder farmers and strengthening the capacity of extension service providers. Promotion of crops such as high value traditional was a priority. This was to help meet farmer demands and technological opinions based on available resources and participation of groups in articulating their needs, hence increasing their farm productivity

2.3 Role of Farmer Groups in Agricultural Development

According to Fabbrizzio and Alberto (2007), rural areas have the majority of the poor and poverty is highly prevalent among smallholder farmers. Elasticity of smallholder farmers' income with respect to farm productivity growth is very slow due to individualism. Common interest groups may lead to cooperation, organization and motivation which in the long run may lead to improved productivity. Unlike common interest groups, groups which are formed without specific interests often fail to perform or even progress due to low participation, lack of cohesiveness and lack of coordination among others (Chamala, Shingi, Swanson, Bentz, & Sofranko, 1997). Groups are important in keeping farmers in the foreground and in increasing influence of community activities, hence a fast multiplier effect. Groups depending on its composition can help to establish more functional connections among themselves and enhance developments and food security in the communities. Group composition is the types and number of people who have come together to make a population. The outcomes of enterprises are normally more helpful towards its members than outside members in a well composed in-group in terms of behavior. Cartwright, Darwin, Zander and Alvin (2012) observe that different sets of subgroups would result as one chooses to classify them in age, sex, socio-economic status and religion among others. However in task oriented groups, subsets of members which are

likely to have interest are those that are distinguishable by virtue of their differences concerning what they prefer, the group decision and solutions to be undertaken. People need to interact with outsiders for exchange of information, ideas and resources and work as a team for improved livelihoods. This is because such groups are guided by values and norms which when respected and honored can put members together. Groups create spread effect which is one of the aims of creating CIGsin the community.

Group innovativeness empower farmers to make rational decisions and initiate collective activities to solve their own problems and that is why groups are used by change agents as a tool to decision making (Waweru, 1993). In addition, group approaches are more instrumental in community development programmes than individual approaches because they try to revitalize and strengthen members of communities and to increase the influence of community activities to improve their livelihoods. Women groups especially, have been the most successful organizations in bringing social and economic benefits to members of the family and beyond. Working with groups rather than individual farmers is considered more conducive to effective extension services because the competition among groups becomes a major factor in facilitating dissemination of extension messages.

A study by Macharia (2013) indicates that Common interest groups are formed according to the interests members have on the opportunities promoted and that males and female have equal chances to join group of choice. The choice is made according to the available resources that can be endowed by the community members to implement their desired activities accordingly. CIGs enable farmers to make their own and proper choice of desired high value traditional crop enterprises that can improve their livelihoods economically and socially (MOA, 2006). The above findings show that groups have a role in the farm and community productivity. According to Otieno (2010), increase in farm productivity has been realized among members of various Common interest groups and other farmer groups among others. This study aimed at determining the influence of CIGs on productivity of HVTCs.

2.4 Role of Common Interest Group Approach in Extension Service

Common interest groups are made up of people with similar interests who have come together with a common goal. According to Ministry of agriculture (2001) various kinds of common interest groups which are agriculture based such as dairy, tea, sugarcane and coffee cooperatives have been in existence in Kenya since independence. The activities of such groups are done in large scale and their main focus is marketing of farm products. Common interest group approach among smallholder farmers was introduced to address economic and social processes. It was introduced under focal area (FA) extension approach which provided the main framework for the delivery of extension services with the necessary modification to accommodate lifestyles of the communities. The common interest group approach was designed to focus and particularly emphasize on group formation to build on one another's capacity and to cater for a variety of farmers who would adopt technologies of need to improve on productivity in their farms. It is in this strength thatthis study was conducted. In the previous extension approaches, group formation was mainly for commercialization and smallholder farmers were not involved in groups. The farmers remained isolated from the rest of the groups and could not produce as large scale farmers, hence low productivity of certain crops most of which were traditional food crops such as cassava, sweet potatoes, sorghum and local vegetables.Farmers with common interests, form the core of a common interest group which for this study washigh value traditional common interest groups.

A group could be established from existing groups or from individuals who come together having the same interest. Common interest groups are normally formed during Participatory Rural Appraisal (PRA) process (MOA, 2001). The formation of CIGs is a structural process facilitated by agricultural extension agents and other related stakeholders who use posters and pamphlets to promote opportunities for enterprise development. CIG based approach promote participatory method that enable extension service providers to play an active but catalytic role in identifying potential opportunities and appropriate enterprises for CIG members. Wide spectrums of opportunities including high value traditional crops are identified to accommodate various categories of farmers with respect to resources endowment and socio- economic status (Millie, Antony & Gedeon, 2006). The extension opportunities are offered to willing farmers to form groups with other farmers who have interest in the same enterprise. Farmers, who are

interested in the promoted opportunities, register and form groups. Once members are registered, group activity development can commence starting with election of the committee to co-ordinate group activities. Farmers are trained by relevant stakeholders based on their areas of interest to build their capacities on technological aspects of enterprise and social development (MOA, 2007).

A study by Manrid, Peter and Wakhungu (2012), showed that more female joined CIGs as compared to males and that most youths between the age of 30 and 35 years joined CIGs through change agents and use of promotional posters. The results further showed that CIG members in Western Kenya achieved higher production levels and that CIGs had increased chances to accesstraining on new technologies. However, the study did not focus on high value traditional crops by CIGs. Research findings on CIG influence on implementation of crop production technologies by Otieno (2010) indicated that CIG strategy has a significant and positive influence on crop production. He further points out that the CIG methodology should be modified and record keeping up scaled among farmers to assist in improving production. A study by Richard (2007) on the social and economic impacts of CIGs approach to extension service in Kenya showed that members of CIGs had significantly increased access to extension services in general. The study sought to find out if membership in CIGs had an influence on HVTCs productivity by making comparison with non-members growing same crops.

2.5 High Value Traditional CropProductivity in Relation to Common Interest Groups

High Value Traditional Crops (HVTCs) are crops such as cassava, sweet potatoes, arrow roots and sorghum which are cheap to produce and are of high nutritional value. According to INTERPAKS (1996), international investment in HVTCs in the past has been negligible even though HVTCs are critical for feeding the worlds most disadvantaged regions.World food shortages can be eliminated by increasing food and agricultural production and can be done through application of modern technology; groups with similar interests and reviving HVTCs.INTERPAKS (1996) further reports that HVTCs currently cover 250 million hectares in developing world. In Sub-Saharan Africa, HVTCs are more important than cash crops both in area and in their contribution to the diet. These crops play a dominant role in feeding the world population and therefore improvement in production is needed through groups to reduce food

insecurity hence reduced hunger. The persistence of widespread food insecurity underscores the futility of increasing production without addressing the underlying social, economic, political, extension methods and adoption of modern technologies. According to MOA report(2005),food security depends on the country's supplies of food, the income of the population, accessibility to the available supplies, the consumption rate and the amount that can be set aside for future use. These could be accomplished through more effective education and trainings, ecologically suitable farming practices and appropriate choice of crops grown in groups for a fast spread effect. In Kenya, half of the hungry are in farm households many of who depend on HVTCs but are not provided with means to increase their productivity (MOA,2005). Providing means through CIG approach to increase food production and incomes of smallholders is an essential step towards alleviating hunger globally, in Africa and in Kenya.

High value traditional crops are important in food security because they are drought resistant and can grow in a wide range of climatic conditions. A research report by KARI (2006) showed that most HVTCs such as sweet potatoes, arrowroots and local vegetables are disease and pest resistant and even if affected by pests cannot result into total crop failure like other crops. During long dry spells, cassava becomes a major food security crop as it can be used in fresh form or its flour for porridge. HVTCs are nutritionally important as they contain nutrients such vitamin A for orange fleshed sweet potatoes and a lot of carbohydrates in all sweet potatoes varieties do not require frequent application of manures and fertilizers as their roots can draw and use soil nutrients deep from the soil. Most parts of HVTCs are used as livestock feeds and for human consumption. They have high potential in marginal areas and perform better in adverse weather conditions than other crops in such areas despite receiving less attention which forms their basis for food security. HVTCs are produced widely around the country in small areas and are not traded to any significant extent in national markets. Opportunities thus exist for extending production from major crops such as rice, maize and wheat to HVTCs (Henry, 2005).

Some of the opportunities are use of CIGs which could cause spread effect through bulking and distribution of planting materials and production of HVTCs to help feed the country's most disadvantaged regions. One of the essential steps by the Ministry of Agriculture toward increasing production of HVTCs is through CIG approach (Richard, 2007). HVTCs are

promoted through CIGs because they can easily be grown by farmers and planting materials can be found locally with farmers and the formation of groups can enhance sharing of those materials. HVTCs are also promoted through CIGs so that the produce can be marketed in groups since most of them are bulky and most farmers opt to sell at farm gate and at very low prices.Where groups are formed and are in need of any materials which are not locally available, they can source for the materials as a group. Sharing of materials and ideas resultsinto social facilitation and most of the farmers do not feel neglected anymore (Stubbs, Mwangangi, Muiruri & Mwangangi, 2012). The study was done to determine the effect of CIG approach in the production of HVTCs in Miwani division.

2.6 Group identity and Role of Groups in Adoption of Agricultural Innovations

Adoptionis the process through which farmers learn new technologies, try them in their farms, continue practicing and eventually own the technology if its benefits are realized (Mael & Ashforth, 1995). Technological innovations in agriculture entail new ideas disseminated to the farmers by extension agents in order to improve on farm productivity. **A**doption of technological innovations in agriculture according to Feder and Richard (2007) has attracted considerable attention among development economists because new technologies seem to offer an opportunity to increase production and income substantially. Adoption is a process which involves awareness creation, learning, perception, trial and finally practicing a certain technology as per skills learnt by the farmer. For adoption of a technology to take place, group members must pass through five stages by learning which includes awareness, interest, evaluation, trial and finally adoption. Awareness about a technology leads to interest, putting the technology into trial and adoption if deemed necessary. They further explain that constraints to the rapid adoption of innovations involve factors such as insufficient capital, lack of credit, limited access to market and information, labour shortages, lack of equipment, lack of interest and inadequate farm size. There is also inappropriate transportation infrastructure, and inadequate incentives associated with farm tenure arrangements. Removing these constraints can result in adoption of improved practices and change in crop composition. CIG approach targeting smallholder farmers with similar interests may be one of the ways to create uniform and immediate adoption of agricultural innovations which has been quite rare according to past experiences.This report was on CIG approach and agricultural innovations and not on specific crops.

Group identity is common among members with collective feelings and is able to define who they are in terms of their socio-economic status, age, education level, clan, area, business and gender as stated by Surguy (2000). Group identity can either lead or not lead to adoption of agricultural innovations. For instance CIG members of any HVTCs can decide on how group activities should be carried and define them according to the conditions that prevail among members. Members of a minority group tend to identify more strongly with their group than the majority group resulting to re-categorization of groups. However when mergers involve both low and high status groups, members of low status groups experience less common group identity than do members of high status groups. When people are in groups, actual differences between members of the same category decrease and as a result, people are able to learn from one another. This may mean that members of orphan crop CIGs can share ideas and other resources with one another to improve on productivity. Group categorization can also give negative results as some farmers especially those of low status may be left outside development bracket.

Forsyth (2006) explains that a homogeneous group perceives problems along the same line for more effectiveness. This is because they take action as agreed upon by members of the group. However if a group is too homogeneous in terms of age and gender, members may get along well but lack differing perspectives to generate ideas from outside. This may impact negatively on group processing leading to group disintegration into small groupings within one group. A heterogeneous group perceive problems differently and opinions of persons of higher status in such groups have more influence and tend to evaluate more favorably even when the bases of their status is irrelevant to the problem. On the other hand if a group is too heterogeneous and large in size, the advantage of talent may be lost because the group may differ in coordination and may result in diverse and wide effects such as disunity as different members will come up with different ideas.

According to Mael and Ashforth (1995), group identity consists of four components: bidirectional influence from the individual to the group and from the group to the individual; membership or a feeling of belonging; fulfillment of needs, and shared emotional connection which are as a result of power, influence and emotions. It is noted that bidirectional influence

from individual to group, high economic status or politically able individuals dominate groups. It is also possible that bidirectional influence from group to individuals can give good results as members of the group are able to share what they identify with. Members of a group can only identify with a group when they have a feeling of belonging and when the four components suit every member. Huy (1999) observes that identity in groups can cause emotions which can also seriously constrain group's willingness to change or even perceive the need for change. A report from Kenya Agricultural Productivity project (KAPP), written and compiled by Mauyo, Wanyama, Lusweti and Nzomo (2006), stated that CIG approach was perceived to contribute to the effectiveness and efficient implementation of ministry of Agriculture activities. It was also noted that that group approach would lead to a more pronounced impact if properly implemented. However, the above information does not link CIGs directly with HVTCs productivity. There was need to carry out this study to compare High value traditional crops productivity among CIG and non-CIG members in relation to adoption and group identity as determinants of productivity among smallholder farmers in Miwani division.

2.7 Role of Groups in Marketing of Agricultural Products

Agricultural marketing involves buying and selling of farm produce by farmers and traders from the farm to the market and to the consumers (Malunga, 2007). Agricultural marketing services involve moving an agricultural product from farmer to consumer. Several interconnected activities are involved in doing this, such as planning production, growing and harvesting, grading, storage, packing, transport, distribution and sale among others. Malunga (2007) explains that marketing has to be customer oriented and has to provide the farmer, transporter, trader and processor with profit. Well-functioning marketing systems necessitate a strong private sector backed up by appropriate policy and legislative framework and effective government support services. Such services can include provision of market infrastructure, support of market information and agricultural extension services to be able to advice farmers on market. Efficient market information can cause positive benefits for farmers and traders. At the market, the product is usually sold by farmers direct to consumers or through commission agents or brokers. Knowledge and information on prices and other market factors as stated by Krishworld (2008) enable farmers to negotiate with traders and also facilitate spatial distribution of markets from rural to urban areas and between markets.

Most extension agents have tried to provide market information services to farmers but these have tended to experience problems of sustainability. Markets play important role in rural development, income generation, food security, developing rural marketing linkages and gender issues. Malunga (2007)also explains that it is not easy to see how small, poor farmers can market their products individually and generate sufficient income unless the activities are carried in groups. These groups are those of similar interests for proper marketing to transport and sell theirproducts collectively, hence reducing cost of transport and marketing and increasing income to the producers. Andrew (2007) states that new marketing linkages between traders and farmers are gradually being developed. These include contract farmer group marketing and other forms of collective action. Produce groups play key roles in supporting the future of agricultural and rural development. According to Jim (2009), farmer groups in some cases unite for collective bargaining power and organize group activities in which members become involved and readily recognize their immediate and concrete interests. Such groups may provide better access to source of production equipment supplies, technology and markets as well as create opportunities for improved markets for crops such as high value traditional crops.

2.8 Theoretical Framework

The theoretical framework for this study is based on Symbolic Social Interaction Theory (SSIT) by George and Blumer (1969). The SSIT focuses on the way people interact through symbols which include words, roles, gestures and rules. SSIT assumes that people are purposeful and act in and towards situations.This relates to this study in that some members may join groups because of their needs or because they are driven by other forces like friends and relatives. The interaction among members of the group and the effect of the group as a whole on its members may stimulate people to develop new ideas and raise HVTCs productivity. It also assumes that people are unique creatures because of their ability to use symbols. This relates to the study because interactions and sharing of ideas byCIG membersmay translate to the increase in productivity. Group performance is highly dependent on its roles and the extent to which it can make decisions accepted by its members. The CIG approach which encourages high farmer participation and high project orientation may influence sharing of information, ideas and even resources through interaction which can lead to increase in productivity of HVTCs. The major concepts in this theory are; the social structure and group identity concept, which can affect the

relationship between members in CIGs and the meaning concept which may in this case, be the reason(s) of being a member of CIG. Effectiveness and role taking concepts depend on the CIG membership with reference to productivity of HVTCs. These concepts enhance collective decision making and group members are able to participate in group activity for improvement. The decision of an individual member to join a group can be self-driven or can be as a result of influence by other factors. Self-concept is a related factor in choice of HVTCs to be produced, and marketing of HVTCs produced by members of the group. This may mean that roles and rules have effects on the way farmers behave towards a situation which can help determine the influence of common interest groups on HVTCs productivity.

2.9 Conceptual Framework showing the concepts under study and their relationship

A variable is a measurable characteristic that assumes different values among the subjects of the study**.** The independent variable in the study was membership in CIGs. The dependent variable was the high value traditional crop productivity measured as yields and income. The relationship between the independent and the dependent variable is shown in Figure 1.

The independent variable may affect high value traditional crop productivity positively or negatively. Membership in CIGs is conceptualized as the process which is as a result of farmers with similar interests coming together. The possible moderator variables such as age, gender, level of education and farm size were controlled for by incorporating them in the study.

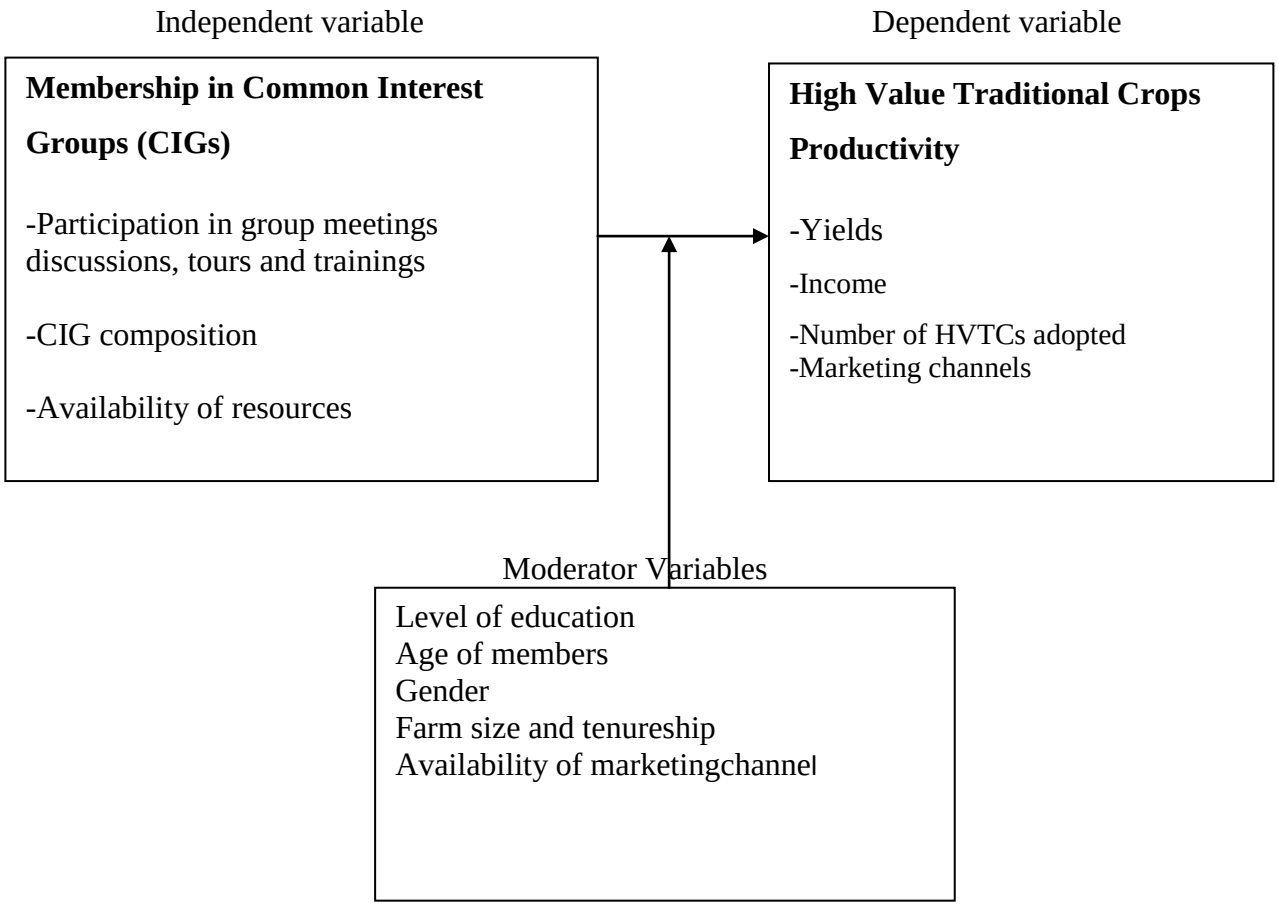

Figure 1: Relationship between independent and dependent variables in the study

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter consists of the procedures that were followed in conducting the study in Miwani division of Muhoroni Sub-County. The chapter includes; research design, the study area, study population, sampling procedures and sample size, instrumentation, data collection and data analysis.

3.2 Research Design

Research design as defined by Mugenda and Mugenda (2003) is an appropriate design usedforthe proposed study.The study utilized cross-sectional survey research design whereby data was collected from CIG members in Miwani division and compared with data collected from non CIG members in Nyando division. Cross-sectional studies are perfect for describing current situations making it possible to study self- reported facts about respondent's feelings, attitudes and opinions and habits. For this design data was collected at a single point in time and each person had a chance of being selected and interviewed independent of another person in the study population (Mugenda & Mugenda, 2003). The other reason for choosing survey is because it allows for use of interviews which was used to help in exploring and gathering information in depth from the sampled population and because it is relatively faster and less expensive. This design enabled the researcher to studying the smaller population, a representative of the larger population and to summarize and organize data in an effective and meaningful way.

3.3 Location of the study

The study was conducted in Miwani division, Muhoroni Sub-County and Nyando Division of Nyando Sub-County. Miwani is one of the divisions in Muhoroni Sub-County; it is in the North West part of Nyando and lies between Kisumu and Nandi Sub-.Counties. Miwani has an area of 72.7 square kilometers with a population of 75,477 (KNBS, 2009). The division is divided into three locations namely, North East Kano, Ombeyi and Nyangoma locations. The area receives a bimodal rainfall of 1000mm to 1150mm annually. The first rainy season falls between February and June and the second between September and December and the common farming practice in the study area is mixed farming of both crops and livestock.

The reason for choosing Miwani division was that it had been singled out as having high potential for traditional high value crop production. The other reason was that promotion and formation of these HVTC CIGs had been consistent since the year 2002 when the approach was introduced in the division. The study was also conducted in Nyando division of Nyando Sub-County, Kisumu County for non-CIG members. Nyando division being the only division in Nyando district, geographically borders Muhoroni Sub-County to the south, Kericho to the east, Nyakach to the south, Kisumu to the west, and Lake Victoria to the south west. TheSub-County has one division in an area of approximately 68.4 square kilometers, and a population of 84,849 projected from figures of 1999 census (KNBS, 2009).

3.4 Study Population

Population is described by Robert, Steel and Torrie (1996), as all possible values of a variable thatof entire group having common observable characteristics.The target population was smallholder farmers who were growing HVTCs in Miwani and Nyando divisions. The accessible population was the CIG members growing HVTCs in Miwani division. In Miwani larger population grow HVTCsas the area is suited to their production. The total population of farmers growing HVTCs in Miwani division was 8,754 by the time the study was conducted (Miwani Divisional Agriculture Office, 2010) while those in Nyando division was 7,649 at the time of the study (Nyando Divisional Agriculture Office, 2010). The HVTCs crops grown are cassava, sorghum, arrowroots, local vegetables and sweet potatoes. The average number of members in each CIG is eight (8) and each member was growing at least one crop. The accessible population for this study consisted of members of HVTCCIGs in Miwani division. A total of 120 Non-CIG members were sampled in Nyando division and acted as a control group.

3.5 Sampling Procedures and Sample Size

A sample as stated by Robert, Steel and Torrie(1996) is a representative part of the population selected for a study while sample size is the proportion which represents a population to be studied. The unit for study was groups which had been in existence for one or more years and growing high value traditional crops (HVTCs). Individuals who were CIG and non-CIG members were the respondents because farm activity implementation is more at individual level rather than at group level. The sampling frame constituted a list of high value traditional crop

CIG members in Miwani division. The list was obtained from Agricultural office in Miwani division while that of the non-CIG members was obtained from divisional Agriculture office in Nyando which is a neighboring division. Nyando division has similar characteristics as those of Miwani division and the high value traditional crops grown in both divisions are also similar. The reason for selecting a sample of non- CIGs members from a different division was to avoid biased results which may be as a result of interaction between CIG and non-CIG members in Miwani division. It was also to allow comparison of high value traditional crop productivity between members and non-CIG members in two different places.

Table 1: Sampling procedures and Sample size for HVTCs CIGs in Miwani division

Location	**No. of CIGs formed**	**Proportion**	**No. of CIGs Selected per location**	**No. of members selected per CIG**	**Total sampled**
Ombeyi	12	0.2	3	8	24
North East Kano	18	0.3	5	8	40
Nyangoma	27	0.5	7	8	56
TOTAL57	**1.0**		**15**	**120 (CIG respondents)**	

According to records by the Ministry of Agriculture in Miwani division, the total number of high value traditional crops CIGs which had been formed between 2002 and 2009 were 57 CIGs. Out of this 12 CIGs were in Ombeyi location, 18 in North East Kano location and 27 in Nyangoma location. To achieve the desired sample size, proportionate sampling was done for CIGs in each location by dividing the total number of CIGs in Miwani by the number of CIGs in a location.

This was done for the three locations and results were as shown in Table 1. Proportionate sampling was done in relation to the number of CIGs in each location to allow comparison.

Proportionate sampling was done to select 15 CIGs from 57 CIGs formed in Miwani division and the number of selected CIGs for each location obtained. Each CIG had an average of 12 members with total membership was 180 and 8 members were selected from each of the 15 CIGsby simple random sampling and the total number of respondents per location calculated by multiplying the sampled CIGsand members selected from each CIG. The total sample size for the study was 120 and according to Kathuri and Pals (1993) table of sample size, the minimum sample size of 100 is recommendedfor survey research. A population of 180 of CIG members was used to get sample size of 120, assuming 5% level of precision and 95% confidence interval.Equal numbers of non-CIGs members who were growing similar HVTCs were also selected by simple random sampling in Nyando division to represent the HVTCsfarmer population.

3.6 Instrumentation

A questionnaire with both open and closed ended questions was used for CIGs and non-CIGs members in data collection to ensure systematic, consistent and objective interviewing.Questionnaire was used because of its practicability and applicability to research problem and size of the population and it is also cost effective as stated by Densembe(2008).Closed ended questions were used to enable the respondents give answers with ease and with an effort to save on time as well as facilitate ease in analysis. Open ended questions were used to encourage the respondents to give their opinion about the subject of the study.The questionnaire consisted of two major sections: Section I will be on Demographic information, section II will be studying CIG members growing HVTCs and Section III will be studying non-CIG members growing HVTCs.

3.6.1 Validity

Validity is the accuracy and meaningfulness of inferences, which are based on the research results. According to Mugenda and Mugenda (2003), it is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study. The tools developed by the researcher were availed to two supervisors from the department of Applied

Community Development Studies who reviewed, counter checked and the researcher advised accordingly. This was to improve the usefulness, meaningfulness and appropriateness of the findings of the study. The review of the instruments was done to ascertain the content and construct validity to ensure that the items were adequately representative of the subject area to be studied.

3.6.2 Reliability

Reliability is a measure of the degree to whicha research instrument yields consistent results according to Mugenda and Mugenda (2003). To assess reliability and ensure consistency of the developed instruments, pilot-testing was conducted among 10 non-CIG membersand 10 CIG members using simple random sampling for farmers growing high value traditional crops in Nyakach division. This is a neighbouring division with similar characteristics as those found in study area. According to Kathuri and Pals (1993), the smallest number for pilot-test that yields meaningful results on data analysis in a survey research is 10. During pilot-testing, a single administration of instruments was done and homogeneity and consistency of all the items assessed to obtain a measure of reliability. The pilot-test data was subjected to a reliability test using Kuder-Richardson 21 (K-R-21) method to measure internal consistency of data. The true result obtained in one item was correlated with results obtained from other items in the instrument. Coefficient was computed to determine how items correlate between and among themselves according to Lewis and Ralph (1997). The value of the coefficient obtained after pilot-test was 0.71 for non-CIGs and 0.73 for CIGs. These coefficients were accepted because they met the threshold given by Kathuri and Pals (1993) to permit the researcher to obtain useful results with small variations among subjects and draw accurate conclusions about the CIG approach. The instruments were therefore found to be consistent and reliable and were adopted for the research study.

Kuder-Richardson (KR21) formula used was as follows:

$$KR = \frac{N}{N-1} * \frac{1-[M(N-M)]}{N*V}$$

KR – Kuder Richardson 21

N – Number of the items in the test scores

M – Arithmetic mean of the test scores

V – Variance of the raw scores or data

3.7 Data Collection

The permit for the study was obtained from the then National Council of Science and Technology and current National Commission for Science Technology and innovation through Graduate School of Egerton University before commencement of the research study. The researcher then obtained other permits from Sub-county Agriculture office, Education and Sub County Commissioner offices. Data was collected in all the locations across the two divisions where questionnaires were administered on CIG and non-CIG members to collect data. The researcher collected data by administering questionnaires to the sampled respondents throughinterviews and some self-administered byliterate farmers who accepted to do so after they were requested. Each group and respondents were accorded notations on the questionnaire to avoid confusion and to ensure effective responses. For the groups, first letter of each HVTCs crop was used as notations for both CIGs and non-CIGs while for each respondent, numbers were indicated on the questionnaires accordingly before the interviews.

3.8 Data Analysis

The collected data was analyzed using descriptive statistics to describe demographic characteristics of respondents, to determine the level of technical knowledge acquired on HVTCs, level of adoption,yields of HVTCs,and marketing of HVTCs and perception of respondents on CIG approach.

Table 2: Summary of Data Analysis

Research Questions	Independent variable	Dependent variable	Statistical tool
1. What is the difference in the level of technical knowledge on HVTCs between CIG and non CIG members in Miwani division?	Members of CIGs versus non-members -Participation in group trainings and tours	High Value Traditional crops (HVTCs) productivity -yields of crops -income from crops -acquired knowledge	Percentages, frequencies
2.What is the difference in the level of adoption of HVTCs between CIG and non CIG members in Miwani division	Membership in CIGs -Availability of resources at their disposal -participation in group trainings and meetings	HVTCs productivity -Number ofHVTCs adopted -yields - income	Percentages, frequencies
3. What is the difference in yields of HVTCs between CIG and non CIG members in Miwani division?	-Membership in CIGs -participation in trainings, availability of resources at their disposal -Group composition	HVTCs Productivity -Income -Yields	percentages, frequencies
4. What is the difference in marketing of HVTCs between CIGand non CIG members in Miwani division?	-Membership in CIGs. -marketing channels -Participation in group trainings and meetings -Group composition	-Marketing channels - Knowledge and skills in marketing -Income from marketed products	Percentages, Frequency

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study. The research findings are presented and discussed under the following subtopics; Socio-economic and demographic characteristics of the respondents, level of technical knowledge among CIG and non-CIG members growing high value traditional crops, the rate of adoption of high value traditional crops among CIG and non-CIG members growing high value traditional crops, the yields of high value traditional crops among CIG and non-CIG members and the influence of CIG approach on marketing of high value traditional crops. The study also provides an overview of the perceptions of CIG members on significance of CIG approach on high value traditional crops productivity.

4.2Demographic and Socio-economic characteristic of the study Respondents

Table 3 depicts the demographic profile ofrespondents.A total of 240 farmers participated in the study, that is, 120 CIG members and 120 non-CIG members. CIG members were composed of 62(52%) males and 58(48%) females. On the other hand non-CIG members were composed of 83(69%) males and 37(31%) females. The composition of males and females in CIGs were more or less the same while for the non-CIGs members there were more males than females. These findings demonstrate that the common interest group approach gave equal chances to both males and females to join high value traditional crop CIGs of choice as stipulated by Ministry of Agriculture (MOA, 2001). The results are comparable with those of Macharia (2013) where 52% common interest group members were men while 48% were females. According to the research findings, about half of both CIG 53(44%) and non-CIG 49(41%) members were aged between 36 years and 55 years. The results also indicated that two thirds 94(78%) of CIGs members and90(75%) of non-CIG members were married. It is therefore evident from the study that most of the respondents were in their middle age and were married. More than half (58%) ofCIG households were made up of between 1and 3 members whereas 65(55%) of non-CIG households had 4-6 members. Two thirds (68%) of CIG members and (61%) of non-CIG members had farm size ofmore than 2 acres. These results show that (31%) of CIG members and (38%)of non-CIG members had almost same farm sizeof 3 acres and above.

Table 3: Demographic characteristics of the respondents

Description	CIG members Frequency (%)	Non-CIG members Frequency (%)
Gender		
Males	62(52)	83(69)
Females	58(48)	37(31)
Age		
Below 18 years	1(0.8)	0(0)
18 – 35 years	32(26)	41(34)
36 – 55 years	53(44)	49(40)
56 years and above	34(28)	30(25)
Marital Status		
Single	26(21)	30(25)
Married	94(78)	90(75)
Household size		
1 – 3	68(58)	44(37)
4 – 6	43(36)	65(54)
7 and more	6(5.1)	10(8)
Farm size		
1 acre and below	6 (5)	8 (6)
2-3 acres	81 (68)	73(61)
3.1 acres and above	31 (26)	38 (31)

4.2.1 Socio-economic characteristics of the study participants

The study also revealed as shown in Table 4 that more than half 61(51%) of CIG members had primary level of education while 18(15%) did not have any formal education. On the other hand half 61(51%) and 53(44%) of non-CIG members had secondary and primary levels of education respectively. From the results both CIG and non-CIG members had relatively the same characteristics in education. Occupation was not different between CIG and non-CIG members

while monthly incomes were higher among CIG members than among non-CIG members.

Table 4:Socio economic characteristics of the Respondents

Description	CIG members Frequency (%)	Non-CIG members Frequency(%)
Level of Education		
None	18(15)	0(0)
Primary	61(51)	53(44)
Secondary	40(33)	63(52)
University	1(0.8)	4(3)
Occupation		
Farmer	68(56)	59(49)
Farmer and public worker	17(14)	19(16)
Farmer and business	34(28)	42(35)
Monthly income (Ksh.)		
Below 1,000	44(36)	56(47)
1,001 and above	76(58)	63(50)

4.3 Technical Knowledge on High Value Traditional Crops Production by CIG and non-CIG members

The first objective was to determine the level of technical knowledge between CIG and non CIG members. This section therefore compares the level of technical knowledge on high value traditional crops (HVTCs) production between CIG and non-CIG members. The influence of CIG approach on CIG members in terms of technical knowledge acquired was investigated by establishing aspects of high value traditional crops production the CIG members were trained on and whether the CIG members gained knowledge from the training. The CIG respondents were also asked whether the information given to them was demanded for and whether it was adequate and the benefits of being in CIGs. The level of technical knowledge was measured by the number of technical areas the respondents' said they were trained on. The study also established

whether the non-CIG members had knowledge on any of the aspects of high value traditional crops production which CIG members were trained on. The technical areas investigated were acquisition of farm inputs, land preparation, planting methods and weeding, pest and disease control, post-harvest practice, value addition and marketing of high value traditional crops products. The results are shown on Table 5

Table 5: Technical knowledge gained by CIG and non-CIG Members

Description	CIG Members Frequency (%)	Non-CIG members Frequency (%)
Production areas:		
1.Acquisition of farm inputs	114(95)	10(8)
2. Early land preparation	94(78)	6 (5)
3. Planting methods and weeding	91(76)	4 (2.5)
4.Pest and disease control	84(70)	4(2.5)
5.Post harvest management	29(24)	0(0)
6. Value addition	6(5.0)	1(0.1)
7. Marketing of produce	40(33)	5(2)
None of the production areas	0	90(80)

The overall results of this study established that CIG members had knowledge in all the seven areas of HVTCs production whereas a small number of non-CIG members had technical knowledge in five areas of high value traditional crop production. This is an indication that more CIG members had technical knowledge because they demand for extension services as groups while non-CIG members do not. There was difference in areas of technical knowledge among CIG and non-CIG members. Membership in CIGs enhanced acquisition of knowledge on production of high value traditional crops. These results are consistent with a study conducted by Otieno (2010) that working with groups is more conducive for more effective extension services because of the competition among groups which enhances dissemination of extension messages. This is because the approach was used to bring extension services closer to farmers through

CIGs who could easily access information as groups than non-CIG members could. These results also compares favorably with the report by Surguy (2000), which stated that when people are in groups, differences among members decrease and as a result people are able to learn even more from one another. The study also sought to find out whether thefarmers had skills on HVTCs production. The skills investigated were: acquisition of farm inputs, land preparation, planting methods and weeding, pest and disease control, post-harvest management, value addition and marketing of HVTCs products. Results indicate that CIGmembers hadmore skills on HVTCthan non-CIG members. The study established that more CIG members compared to non-CIG members expressed having knowledge in technical areas of HVTCs, in all categories.

The study results indicate that membership in common interest groups enhanced acquisition of knowledge and skills on production of HVTCsas shown in Table 5. After computing frequencies and percentages of members and non CIG members having knowledge in various productionareas,results obtained show difference in level of technical knowledgeand skills between CIG and non-CIG members.More CIG membersthannon-CIG members had knowledge and skills in all the production areas of HVTCs studied. This could be because non-CIG members had no direct contact with the extension agents and therefore did not get chance to be trained. Another reason may be because non-CIG members demand for extension services individually and arenot provided with services the same way as the CIG members. These results agree with Manrid, Peter and Wakhungu (2012) that farmers who are in groups benefitmore than those who are not in groups in terms of gaining technical knowledge. This is because extension services are scheduled and timed with sensitivity to the special requirements of group members with specific interest. Common interest group approach as an extension method benefit CIGs by effectively reaching and disseminating messages tothe CIG members despite their different backgrounds. This is contrary to the previous extension approaches like the T &V where there was little positive effect because of poor dissemination of information. This confirms a study by Gautam and Anderson (1999) which stated that, T &V approach had little positive effect because dissemination of information was mainly to the individual contact farmers.

4.3.1. Adequacy of Technical Knowledge

CIG members who growhigh value traditional crops were asked if they thought the technical

knowledge they had received on HVTCs was adequate. There were 7 areas of HVTCs production from which information was being disseminated by extension agents. The results indicated that out of the 120 trained CIG members, 96% acquired knowledge in 6-7technical areas on HVTCs compared to non-CIG members who acquired knowledge in one production area as indicated in Table 6. Membership in CIGs enhanced acquisition of knowledge onall the production areas of the crops. This was an indication that the information relayed by extension agents reached CIG members efficiently. However, knowledge on value addition and post-harvest management was not adequately receivedas only 5% and 24% of CIG members respectively indicated they had knowledge in the seven areas. This implies the information was given but some CIG members still had little knowledge on HVTCs. About half (55%) of non-CIG members had knowledge in only one production area implying likelihood of inadequate knowledge.

Table 6: Adequacy of technical knowledgeon high value traditional crops

Number of productionareas farmers had knowledge	**CIG Members Frequency (%)**	**Non-CIG members Frequency (%)**
1 production area	0	66(55)
2-4 production areas	2(1)	28 (23)
5-6 production areas	3(2.5)	24(20)
7 and more production areas	115(96)	2 (1.8)

These findings compare favorably with a study in Kenya by Mogeni (2005) who reported that farmers with similar interests gain knowledge and benefit from certain technology when trained and engage in some group activitieshence moreattention to production activities. CIG members had more technical knowledge because they had direct contact with the extension agents and were to be able to share information among themselves unlike non-CIG members who were not directly involved in group activities.

4.4 Rate of adoption of High value traditional crops between CIG and non-CIG members

The second objective of the study was to assess the rate of adoption of high value traditional crop (HVTCs) enterprises among CIG and non-CIG members. The study sought to establish previous and current number of HVTCs enterprises grown and adopted by CIG members. The study also sought to establish the type and numbers of HVTCs adopted by both CIG and non-CIG members. Another aspect which was investigated on adoption of high value traditional crops was the number of years which the respondents had grown HVTCs crops. The findings are presented in the following sections:

4.4.1 Previous and current number of HVTCsgrown by CIG members

When asked the number of high value traditional crops they grew before they joined the CIGs, more than three quarters of CIG members 115(96%) were growing one type of HVTCs. The study established that the number of CIG members who adopted more than one HVTC increased after being in CIGs for 7 years as compared to non-CIG members as shown in Table 7. The study also established that 74(62%) of CIG members against 22(18%) of non-CIG members currently grow more than twoHVTCs. This is an indication of low adoption among non-CIG members because most of them maintained production of HVTCs enterprise unlike CIG members who added more HVTCs. The high rate of adoption by CIG members could be because CIG members were trained by extension agents on the crops production and passed through the five stages of adoption of awareness creation, learning, perception, trial and finally practicing the technology with gained skills. This was enhanced through dissemination of extension messages on HVTCs crops through CIGs whose members were able to adopt more crop enterprises. These results agree with the statement by Feder and Richard (2007) that for groups to adopt a technology, members must pass through the five stages of adoption. In this case CIG members were more exposed than non-CIG membersas a result of trainings they had to undergo because of their membership in CIGs.

Table 7: Number of HVTCs adopted by CIG and non-CIG members

Description- Number of HVTCs Adopted	CIG members growing the crops		Non CIG members growing the crops	
Enterprises	**Previous frequency (%)**	**Current Frequency (%)**	**Previous Frequency (%)**	**Current Frequency (%)**
Onecrop adopted	115(96)	46(38)	N/R	98(82)
Two and more crops adopted	5(4)	74(62)	N/R	22(19)

N/R=No Respondents

4.4.2 The type of high value traditional crops adopted by CIG and non-CIG members

The study sought to establish the type of HVTCs adopted by CIG and non-CIG members. This study established that about a quarter 36(30%) of CIG members adopted sweet potatoes growing, whereas 48(40%) adopted cassava growing, 34(28%) adopted arrowroots, 36(25%) adopted sorghum and 43(36%) of CIG members adopted local vegetables growing.

For non-CIG members, the number growing the various HVTCs was smaller compared to that of CIG members as shown in Table 8. From the study results, it is evident that more CIG members than non-CIG members are growing more HVTCs. This may be because CIG members were sensitized and trained on HVTCs production and since then have developed positive attitude which has resulted in adoption of more than one type of HVTCs after 7 years of practice.

Table 8: Types of traditional high value crops adopted by CIG and Non-CIG members

Crop	CIG members frequency (%)	Non- CIG members frequency (%)
Cassava	48 (26)	25(19)
Sweet potatoes	36(18)	26(20)
Arrowroots	34(15)	20(14)
Local vegetables	43(23)	35(29)
Sorghum	36(18)	26(18)
Total	**100%**	**100%**

4.4.3 Period of growing HVTCs by CIG and Non-CIG members

The study was to determine the number of years CIG and non-CIG members have grown HVTCs. The study revealed that more than half 71(60%) of CIG members had grown HVTCs for between 4–6 years while 42(35%) had grown HVTCs for 1-3 years and only 7(5%) had grown High value traditional crops for about7 years. About half 59(49%) of non-CIG members had grown the crops for 4-6 years and 43(35%) had grown for about years as shown in Table 9. More CIG members had grown the crops for a shorter period but had adopted more HVTCs as compared to non-CIG members. This could be because CIG members had chance to pick flagged opportunities of interest for a longer period and had put in practice the production aspects which made them to adopt more HVTCs as motivated by the results achieved by being in CIGs. The non-CIG members could have taken long to adopt due to insufficient knowledge on production of the crops and lack motivation which could be common inthe CIGs.

It should be noted that since the initiation ofCIG approach started in the year 2002, changes among CIG members were realized despite gradual implementation of the HVTCs production. The CIG members had to be taken through aspects of HVTCs production by extension agents before the actual implementation. This study established that more non-CIG members have

grown the crops for a longer period than CIG members and yet the number of HVTCs they are growing HVTCs were few as compared to that of CIG members. The results are consistent with similar studies (MOA 2007) that have demonstrated that public investment in Agricultural extension through CIGs is likely to foster adoption of improved technologies when CIGs are trained on crops production hence, adoption of more crops. CIG members most of who had grown HVTCs crops for six years and below, were picking up faster than the non-CIG members. These results show that CIG members have fully been involved and committed to HVTCs crops production for the last six years after initiation of the approach in the area.

Table 9: Period of production of HVTCs by CIG and non-CIG members

Number of years of growing orphan crops	CIG members frequency (%)	Non-CIG members frequency (%)
1 – 3 years	42(35)	19(16)
4 – 6 years	71(60)	59(49)
Upto7 years	7(5)	42(35)

The study results show that CIG members after being taken through adoption process started to fully practice and adopt more HVTC crops. It is evident from these results that CIG members may still adopt more HVTC enterprises as years go by. Once taken through the process one internalizes and acts accordingly as per their perceptions. There was awareness creation on the importance of HVTCs in the area during flagging of opportunities. During flagging of opportunities, extension agents create awareness on the gross margins and importance of various crops in a focal area at different points. These can be done by placing posters at strategic points or through publicity at church gatherings and chiefs' baraza among others. Once this is done, farmers voluntarily choose enterprises of their choice to form CIGs. When CIG members were taken through trainings; they were learning and perceiving the ideas. After they had perceived, the CIG members started production of HVTCs of choice and finally practiced and adopted as years went by. These results support report by Feder and Richard (2007) that when farmers are taken through adoption process, they practice the technology as per the skills learnt and adopt a

technology with time.It may take CIG members a long time to fully adopt all the HVTCs in question but the increase in numbers of adopted HVTCs is enormous. The study results confirm that removing constraints such as lack of interest, and inadequate technical knowledge can result into increased number of crops grown and CIG members. More CIG members were growing more HVTCs as compared to non-CIG members. The results from this study have revealed that more than half of CIG members had started to diversify their production to more than one crop as a method of improving food security and their sustainable commercial viability. The number of HVTCs grown by CIG members significantly increased from one to more than two crops than among non-CIGs members. This was realized in arrowroots, local vegetables and cassava respectively where CIG members adopted more HVTCs. These findings compares with a study by Henry (2005) which observed that there are opportunities for moving from production of one major crop to many crops through groups which focus on more suitable HVTCs.

4.5 Yields of high value traditional crops between CIG and non-CIG members

The third specific objective was to establish the yields of HVTCs between CIG and non-CIG members. For this objective, the study sought to establish previous and current HVTCs acreage owned by CIG members, yieldof each HVTC produced as per records. The study was also meant to establish and compare the current yields and acreage for CIG and non-CIG members. The study also explored whether there is difference in yields of high Value traditional crops between CIG and non-CIG members and results obtained are discussed below.

4.5.1. Acreage for HVTCs by CIG and non-CIG members

The study revealed that half 61(51%) of CIG members had less than half an acre, 52(46%) had between 0.6-1acre and 4(3%) had more than 1 acre under HVTCs before they joined the CIGs. The situation changed after seven years of implementation of HVTC production related activities. For instance, after joining and involvement in HVTC production activities, 74(62%) of CIG members had committed more than 1 acre of land for HVTCs as shown in Table 10. The study results show that 38% of CIG members had 0.6 to one acre compared to the initial stages of CIG formation, when the acreage was small among CIG members. Six years later, area under production was two and more acres among CIG members. This may be attributed to enhanced knowledge prompting increase in acreage among CIG members. From these results, it may be

imperative to deduce that the greater knowledge acquired by CIG members increased their desire to produce more HVTCs hence increased acreage. The results may also be attributed to participation in CIG activities, sharing of ideas among CIG members, positive competition among CIG members and group identification resulting into higher proportion of CIG members having more than one acre under HVTCs.

Table 10: Acreage for high value traditional crops by CIGs and non CIGs

Acreage	**Previous acreage**		**Current acreage**	
	CIG members Frequency (%)	Non CIG Members	CIG Members Frequency(%)	Non-CIG Members Frequency(%)
Less than 0.5	61(51)	N/A	1(1)	82(68)
0.6-1 acre	52(46)	N/A	61(51)	38(32)
More than 1 acre	4(3)	N/A	74(62)	0(0)
Remained same	3(2)	N/A	3(2)	N/A

N/A= Not Applicable

During the study period, more CIG members had more areaunder HVTCs production than the non-CIG members. Majority ofnon-CIG members, 82(68%) had ≤ 0.5 acres of land plantedwith HVTCswhile the majority of CIG members had increased land for HVTCs to more than 1 acre. The reason for the difference is that common interest group members trained and participated in group activities and had chance to practice what they were trained on and realized positive results which prompted them to increasing acreage for HVTCs production. As for non-CIG members, it was business as usual because they practice on individual basishence limited knowledge on HVTCs production.

4.5.2 Yields of High value traditional crops grown by CIG and non-CIG members

The study sought to establish the current and previous yields per acre of each orphan crop

produced by CIGs members. The findings as shown in Table 11 revealed that the previous average yields for cassava among CIG members was 4 tons per acre while the current yields were 10 tons per acre. The current yield of cassava among non-CIG members at the time of the study was 6 tons per acre. The mean yields for cassava among CIG members were high as compared with that of non-CIG members. The study results indicate that yields of arrowroots were also high among CIG members than among non-CIG members. The previous mean yield of arrow roots among CIG members was 2.6 tons per acre which increased to 6.4 ton per acre. The previous mean yield per acre for local vegetables among CIG members was 3 ton which increased to 7 tons. The yields of sweet potatoes among CIG members increased from 2.7 tons to 13 bags per acre. Yields of sorghum increased from 3 to 7 bags among CIG members. The yields of sorghum crop recorded among non-CIG members was5.5 bags per acre.

Table 11: Yields of high value traditional crops by CIG and non-CIG members

Description	Previous Yields in 90kg bags or tons		Current yields in 90kg bags or tons	
Type of HVTC Grown	CIG Members	Non-CIG Members	CIG Members	Non-CIG Members
Cassava	4.0 tons	N/A	10 tons	6.0 tons
Arrowroot	3.1 tons	N/A	6 tons	2.0 tons
Local Vegetables	2.7 tons	N/A	7 tons	6.5 tons
Sweet potatoes	6.0 tons	N/A	13 tons	7.7 tons
Sorghum	3.0 tons	N/A	7 tons	5.5 tons

T= Tonnes

N/A = Not applicable

There was remarkable increase in yields for sweet potatoes, cassava, local vegetables and sorghum. The increase in yields by CIG members could have been influenced by access to

extension services and sharing of production ideas among CIG members. This is in line with a report by Richard (2007) that it is through groups and access to extension services that production can be improved. The study results are consistent with a report by MOA (2006) that state that yields of HVTCs can increase with good production practices. It also states that groups formed around a common purpose are the most cost effective for sustainable development in Agriculture. The study results are consistent with World Bank report (1999) that states that access to knowledge is an important aspect in determining the success of HVTCs production as influenced by common interest group approach. This study results further confirms a report byNALEP (2007) that groups formed around a common interest purpose are the most cost-effective for sustainable development in agriculture. CIG members were trained on a number of good production practices which influenced HVTCs productivity. It is important to note that when farmers join CIGs they become more pro-active, engage more land for production of HVTCs and become implementers of the recommended technologies. Common interest groups when used well, are better in the implementation of technologies and can improve economies of scale and hence productivity of HVTCs.

These findings indicate that membership in groups is associated with high productivity of HVTCs crops hence improved capacity in use of land. Increase in crop yields over the years among CIG members can be attributed to knowledge gained by participating in HVTCs group activities, change of production practices and sharing of knowledge on production aspects. This is in accordance with the research results by INTERPAKS (1996) that productivity could be improved through more effective education, trainings and appropriate choice of crops grown and that it is through groups that production can be improved. The association in groups could help in addressing underlying social and economic issues and adoption by people with similar interests. These findings also show that being in CIGs can contribute more than 100% increase in productivity. The study results also show that CIG members have consistently high yields as compared to non-CIG members. This finding is consistent with research findings by Ministry of agriculture (MOA, 2006) that working with groups other than individual farmers is considered more conducive and effective in extension service. This is because the competition among group members becomes a major factor in facilitating dissemination of technical messages and hence increased knowledge and productivity.

The study results show that current yields and acreage of the HVTCs between CIG and non-CIG members were different. The study revealed that yields of HVTCs between CIG members were higher as compared to those among non-CIG members. More than half the CIG members 76 (70%) had committed more acreage for the crops after joining CIGs. The findings show that that membership in HVTC CIGs influenced the increase in acreage for HVTC production amongCIG members over the years because of their participation in group activities. The CIG members may have committed more land for crops production after they realized the need which was as a result of the positive influence of CIG approach resulting into improved productivity as years progressed. The results of the study which indicated increased productivity was in agreement with the main aim of initiating CIG approach by MOA (2001) which stated that CIG approach will help enhance farmer's collective capacities to improve their economic and social status by increased productivity. The results are alsoagree with the study report by Henry (2005) that states that groups with common interest perform better and can utilize all the opportunities to increase productivity in their farms. Group members with similar interests but produce on individual basis can be more stable and have more chances to improve their farm productivity.

4.6Marketing of High value traditional crops between CIG and non CIG members

The fourth objective of this study was to determine the level of marketing HVTCs between CIG and non-CIG members. The study aimed at establishing whether there are differences in marketing of HVTCs between CIG and non-CIG members. This was determined by studying the channels through which the products were sold, the annual income from HVTCs and knowledge on marketing skills by CIG and non-CIG members. The information gathered from the two divisions shed the light to the comparison outlined in the difference between CIG and non-CIG members. The results as shown in Table 12 shows marketing channels for HVTCs crops whereby 63(55%) of CIG members and 32(27%) of non-CIG members sold their produce at wholesale, 37(31%) CIG members and 22(18%) non-CIG members sold at retail, 19(13%) CIG members and 64 (54%) non-CIG members sold through middlemen, while a few sold through all channels. The findings show considerable market channels used by members of CIGs. There were a wide range of marketing outlets from which the CIG members could choose and results show that sales were mostly done through formal arrangements among CIG members and

informal among non CIG members. Formal markets involved prior arrangements on quantity and prices between group members and buyers while informal marketing was done by middlemen and wholesalers who went from farm to buy without proper arrangements.

This is an indication of having knowledge on marketing as a result of being members of CIGs. More than half 63(55%) of CIG members sold their produce at wholesale. This could be a way of cutting down on costs of transportation, a strategy they may have learnt during their training. Group marketing enabled CIG members to lobby for better market prices for their produce resulting in high income as compared to non-CIG members. The study results are consistent with Forsyth (2006) who points out that those groups with similar interests become more effective when they take collective action agreed upon by group members. This may not have been the case for non-CIG members most of who sold their produce at individual levels. Non- CIG members sold their produce to middlemen and not directly into the market an indication of losing part of value for their produce which is earned by brokers. Middlemen currently enjoy the largest market share among non-CIG members (54%) than among CIG members (13%).

Table 12: Channels of marketing HVTCs by CIG and non-CIG members

Marketing Channels	**CIG members Frequency(%)**	**Non-CIG members Frequency (%)**
Sale of produce at retail and farm gate	37(31)	22(18)
Sale of produce at wholesale market	63(55)	32(27)
Sale of produce through middlemen	19(13)	64(54)
Sale in all channels	1(1)	2(1)

The study also investigated annual income generated from the sale of HVTCs by CIG and non-CIG members and the results are as indicated in Table 13. The study revealed that two thirds, 76(63%) of CIG members and half 62 (51%) of non-CIG members earned Kshs.8001 and above

annually from the sale of their HVTCs. About one quarter of CIG members 32(27%), earned between KShs. 4001 and 8000, 10(8%) earned between KShs. 1001and 4000 and 2(17%) earned Ksh.1000 and below, respectively. More CIGs than non-CIG members earned Ksh.8,001 and above from the HVTCs sales. Small numbers 13(11.5%) of non-CIG members earned Ksh.1, 000 and below. From the study CIG members earned much more than non-CIG members considering the fact that more than ¾ l 108 (90%) CIG members earned from Ksh.4001 to Ksh.8, 000 and above.

Table 13: Annual income from HVTCs by CIG and Non-CIG members

Income from HVTCs crops	CIG members frequency (%)	Non-CIG membersfrequency (%)
Kshs 1000 and below	2(1.7)	13 (12)
Kshs1001– Kshs 4000	10(8)	29 (24)
Kshs 4001 – Kshs 8000	32(27)	17(14)
Kshs 8001 and above	76(63)	62(51)

Whereas both CIG and non-CIG members were also engaged in other areas of income generation, there were regular earnings and improved income from HVTCs by CIG members as compared to non-CIG members. CIG members may have earned more from the HVTCs than non-CIG member because first, CIG members had enhanced knowledge on principles of crop production hence high productivity due to adoption of more HVTCs. Second, CIG members were trained on various marketing aspects and as a result had enhanced knowledge and skills of marketing. Third, CIG members may have earned more because they increased acreage for HVTCs and increased yields. Fourth, they may have used marketing skills acquired to conduct

collective group transportation to cut on costsand group marketing to lobby for better prices.Last, because most CIG members sold at wholesale prices, they may have had better bargaining power resulting to more income compared to non-CIG members.

These results are agree with the findings by Malunga (2007), that sufficient income can only be generated by smallholder farmers through collective group activities and that it is not easy for small and poor farmers to market their products individually and generate sufficient income unless the activities are carried in groups. However, it can still be seen from results that CIG members were not able to realize the full market potential despite getting high yields and income than non-CIG members. Non-CIG members had low levels of marketing skills and therefore were more vulnerable in selling their produce with the final consequence of getting low income due poor negotiation ability and lack of market information resulting into poor pricing. This is a common practice among farmers who sell their produce individually. The long value chains supply through middlemen, wholesalers, retailers and then to consumers reduce the price paid to the farmer or increases the price the consumer pays or both. The full market can be realized if more farmers growing HVTCs join CIGs so as to transport and market their products collectively and improve their bargaining powers. This is in line with Henry (2005) that use of CIGs could cause spread effect through knowledge gained on production aspects. The farmer organizations could be a means through which market information and arrangement of the commodity sales would be disseminated. Consequently it implies that those in membership are more likely to progressively increase HVTCs productivity, hence sell surplus and earn more income in the future.

The study also sought to determine knowledge on marketing skills among CIG and non-CIG members. Results in Table 14 compares proportion of farmers reporting on marketing skills gained by being in CIGs. The results indicate that all 120 (100%) CIG members were trained on market information and good market planning and more than half 98(62%) of CIG members reported having adequate knowledge on production for market. Almost all 110(92%) CIG members reported having received knowledge on market survey and channels while 50% of CIG members had knowledge on collective marketing. Non-CIG members had little knowledge on marketing as shown in Table 14 where, 1% had knowledge on production for marketing, 2%

each on market survey and channels and collective marketing consecutively. The results of the study also show that about 12 (10%) of non-CIG members had knowledge on market planning. This was different for CIG members who gained moreknowledge on HVTCsmarketing and were able to market and earn more income from their products.

Table 14: Knowledge on marketing skills among CIG and Non-CIG members

Knowledge on Marketing skills	CIG member's frequency (%)	Non-CIG member's frequency (%)
Marketinformation and planning	120 (100)	12(10)
Production for market	98 (62)	2 (1)
Market survey and channels	110(92)	4 (2)
Collective marketing	60 (50)	4 (2)

The level of knowledge in marketing HVTCs in terms of market survey, planning and production for market between CIG and non-CIG members was different. The level of knowledge in marketing and the actual marketing HVTCs were high among CIG than non-CIG members. This difference could be attributed to attendance and participation in CIG activities resulting into enhanced knowledge on group marketing of produce which they may have used to earn more income. This supports report by Krishworld (2008) that knowledge on prices and marketing factors enable farmers to negotiate with traders and make more profits. From the results of the study, it can be said that the knowledge gained on marketing could have enabled CIG members to have bargaining power resulting to more profits.

4.7 Perceptions of CIG members about Common interest group approach

The objective was to describe the perceptions of common interest group members about

significance of CIG approach on high value traditional crops productivity. This was to engage CIG members in order to get their opinions and understanding of CIG approach in extension service.

The study revealed that 111(92%) of CIG members responded that the approach promoted socio-economic equity among members of groups and that the approach is suitable for all categories of farmers. CIG members had increased knowledge on HVTCs production and suggested that more farmers to be targeted to ensure that theybenefit from its positive influence. CIG members indicated the need for more training on various areas to enhance their knowledge further. This is an indication that gaps still exist in respect to adequacy of knowledge on HVTCs production by CIG members. CIGs members perceived the approach as having succeeded due to transparency and accountability embraced by members of the groups after undergoing trainings.

CIG members considered the approach as one which enabled them to pursue their common goals and shared information as like-mindedfarmers without discrimination. This is because they acquired knowledge through group approach otherwise unavailable to individual farmers who were not in CIGs.CIG members perceived the approach as a change approach where there was prompt response to queries and issues and especially in promotion of effective communication geared towards achieving their goals. They perceived the approach as friendly and that through the approach they gained strength, courage and knowledge to improve on productivity.

All the CIG members said that the CIG approach was good because services were brought closer to many people in the selected area and knowledge gained helped in improving productivity as CIG members were motivated to grow HVTCs. The overall results of the study showed that CIG members benefited from the CIG approach because it made a difference in their lives in terms of increased yields, income, enhanced knowledge and adoption of HVTCs. CIG approach is therefore perceived as a better option as compared to the previous extension approaches.Results agree with a study by Otieno (2010) which indicated that CIG strategy has positive influence towards production of crops. The study on implementation of CIG approach further points out that the CIG approach should be modified to assist in improving further production. According to CIG members, the approach could effectively influence more farmers if the period for implementation is increased to more than one year in a focal area. The approach was perceived

to be more effective and efficient compared to the previous extension approaches.

CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary, conclusions, recommendations and areas suggested for further studies. The summary consists of the introduction and purpose of the study undertaken including the variables which were under the study. Conclusions are drawn from the findings of the study while recommendations consist of suggestions to fill gaps realized as a result of the findings which could help to improve certain areas. Finally the chapter presents some possible areas for further studies in relation to high value traditional crop production and CIG approach in extension services.

5.2 Summary

The common interest group extension approach was designed to focus and particularly emphasize on group formation to build capacity of members of groups and to cater for a variety of farmers who adopt technologies to improve productivity in their farms (MOA, 2001). In the previous extension approaches, smallholder farmers were not involved in group activities and remained isolated from the rest of the farmers. This resulted into inadequate knowledge, low adoption rate and low productivity of crops especially high value traditional crops (HVTCs). High value traditional crops were neglected by most of the farmers in Miwani but the idea of promoting opportunities in CIG approach helped in creating awareness on the importance of HVTCs and the number of those growing the crops increased. The purpose of the study was to find out the influence of common interest group approach on HVTCs productivity among smallholder farmers in Miwani division.

The overall target population was CIG members growing HVTCs in Miwani division while the control group was the non-CIG members also growing HVTCs in Nyando division. Nyando division has similar characteristics as those of Miwani division and the HVTCs grown in both divisions are also similar. The reason for selecting non-CIGs members from a different division was to allow comparison of HVTCs productivity between CIG and non-CIG members. According to the findings, more than half CIG (78%) and non-CIG (75%) members were between the age of 36 and 55 years and were married. Results revealed that half (52%) of CIG

members and (69%) of non-CIG members were males while 48% of CIG and 39% of non-CIG members were females. These findings demonstrate that the common interest group approach gave equal chances to both men and women to join CIGs of choice as stipulated by Ministry of Agriculture (MOA, 2001). CIG members had an average of 1.5 acres under HVTCs while non-CIG members had an average of 1 acre for HVTCs production. Majority of CIG members had primary levels of education while most non-CIG members had reached secondary levels.The findings also established that all CIG members had knowledge and skills on HVTCs crops production. CIG members had high level of technical knowledge compared to that of non-CIG members. The level of technical knowledge was measured by the numbers of technical areas the respondents said they were trained on and these included planting methods, weeding, pest and disease control, post-harvest management, value addition, acquisition of farm inputs and marketing.

There was a difference in adoption of HVTCs between CIG and non-CIG members. The results showed variations in the number of HVTCs adopted by CIG members. More than half 74(62%) of CIG members had grown more than two HVTCs while only 22(19%) of non-CIG members had grown more than two HVTCs. More than half 71 (59%) of CIG members and half 59(49%) of CIG members had grown HVTCs for a period of 4-6 years. Adoption of HVTCs among CIG members six years after joining CIGs was high compared to non-CIG members hence qualifies CIG members for being fast adopters than non-CIG members. The findings established that 74 (62%) of CIG members had more than one acre land for HVTCs production while 82 (68%) of non-CIG members had less than one acre under HVTCs. Yields of HVTCs among CIG members were higher as compared to those of non-CIG members. For instance, the yields per acre of sweet potatoes at the time of the study was 13tons for CIG members and 7.7 tons for non-CIG members, cassava was 10 tons for CIG members and 6 tons for non-CIG members, local vegetables 7 tons, and sorghum 7 bags for CIG members while for non-CIG members the yields for vegetables and sorghum were 6.5 tons and 5.5 bags respectively. Yields of arrowroots among CIG members were 6 bags and 2 bags for non-CIG members. The study results showed increased productivity of HVTCs as a result of increase in knowledge, increase in acreage for HVTCs production and adoption of more HVTCs by CIG members.

With respect to marketing and income from HVTCs production, the study results showed that membership in CIG resulted in good marketing of HVTCs among CIG members than among non-CIG members. After implementation of CIG approach, it was established that more numbers of CIG members utilized all options of marketing resulting into higher income as compared to non-CIG members. For instance, the results indicated that more CIG members 63(53%) than non-CIG members 32(27%) sold their produce at wholesale. CIG members who marketed their products at retail were 37(31%) and non-CIG member were 22(18%). More than half of the non-CIG members 64(54%), sold their produce through middlemen. The market channels through which the produce were sold determined the income among CIG and non-CIG members. When products are sold in groups through wholesale, the CIG members have more bargaining power resulting in high income.

The annual incomes by CIG members from the crops were higher as compared to that of non-CIG members. The study revealed that 76(63%) of CIG members and 62(51%) of non-CIG members earned Kshs.8001 and above annually from the sale of their crops. Whereas 32(27%) of CIG members earned between KShs. 4001 and Ksh.8000, 14% non-CIG members earned between KShs. 4001and 8000. The overall marketing and sales of HVTCs amongCIG members were more than those of non-CIG members. The possible reason for this could bedue to knowledge and skills acquired by CIG members on marketing and other production areas.

5. 3 Conclusions

The conclusion drawn on the influence of CIG approach on high value traditional crops productivity is that there was considerable difference between CIG and non-CIG members with respect to technical knowledge and skills acquired on the crops production, number of the crops adopted, yields and income earned from the HVTCs. A higher proportion of CIG members had knowledge in HVTCs production as compared to non-CIG members. In this context, it is imperative to conclude that, the results of this study have revealed that CIG approach is effective because of its multiplier effect and has given positive results in terms of level of knowledge, adoption, yields and marketing of HVTCs and therefore has influence on HVTCs productivity among smallholder farmers. This was seen in increased membership, acreage under HVTCs, level of knowledge, income and adoption among CIG members than among non-CIG members.

From theresults, it can be concluded that groups are important in keeping farmers in the forefront of new ideas and technologies in agriculture and in increasing influence of community activities, hence a fast multiplier effect. Groups can increase the ability of individuals to acquire information and technologies in improving productivity in the farm. CIG members picked HVTCs and improved on productivity within a short period. This confirms that CIG approach has the potential to ensure socially and economically equitable rural development hence improved living standards among smallholder farmers by increased productivity of HVTCs. Based on the findings of this study, it can be concluded that CIGs are important farming community arrangement that can be used by extension agents to bring about positive change among smallholder farmers. The results indicate that CIGs have significant influence and members of CIGs has key role to play in the productivity of HVTCs and therefore lead to a more pronounced positive impact among smallholder farmers.

5.4 Recommendations

The study highlights several possibilities of improving influence on common interest group approach on HVTCs in Miwani division. The following recommendations can improve influence of CIG approach on HVTCs productivity among smallholder farmers.

1. The use of CIGs should be part of extension system but in a more systematic manner by Identifying and involving more actors in the value chains through CIGs. The approach should not be used in isolation of the other extension approaches.

2. Despite the improved knowledge, yields, adoption and marketing of HVTCs among CIG members, the acreage and number of crops grown by CIGs was still low. Gaps for interventions should be identified by extension agents in order to capacity build farmers on the importance of diversity and improved acreage under HVTCs for increased output.

3. Promotions of HVTCs production should be geared towards commercialization, innovativeness and competitiveness in order to generate more income hence food security.

5.5 Areas suggested for further research

On the basis of the findings of the study, the following are important areas for further research.

1. The role of high value traditional crops production in food security among smallholder common interest groups.

2. Challenges in marketing of high value traditional crops among smallholder farmers.

3.Influence of gender on High value traditional crops production.

4. Sustainability of CIGs as an extension approach for rural development.

References

Andrew, W.S., (2007*).Approaches to linking producers to markets***.**Food and Agriculture, Rome.

Bindlise, V., and Evenson, R., (1993).*Evaluation of performance of training and visit extension in Kenya.* A World Bank technical paper no. 28, African technical department series,Washington D.C: The World Bank.

Cartwright, Dorwin, Zander, and Alvin,(2012). *Group Dynamics (3RD Ed),* America Psychological Association,Washington University and Research Centre.

Chamala, S., Shingi, P.M., Swanson, B.E., Bentz, R.P. and Sofranko, A. J., (1997).*Establishing and strengthening farmer organizations: A reference manual.* Research, Extension and Training Division, Food and Agriculture Organization,

Rome.Densembe, M.,(2008). *Communities of Practice*: A research paradigm for mixed Methods.Journal of Research methods.2(3) 270-283.

Evenson, R., and Mwabu, G., (1998). *The Effects of Agricultural Extension on FarmYields in Kenya.* Economic Growth Centre, Yale University series.Working Paperno. 798. New Haven Connecticut.

Fabrizzio, B., and Alberto, V., (2007). *Beyond food production: The role of Agriculture in Poverty reduction.* Food and Agriculture Organization (FAO), USA, United Nations Northernton Press.

Feder, G., and Richard,S., (2007). *Role of groups in agricultural innovations*. University of California, Berkley.World Bank.

Forsyth, D.R., (2006). *Group Dynamics, 4thEdition.*Belmont,CA: Thomson Wadsworth.

Gautam, M., and Anderson, J. R., (1999). *Reconsidering the evidence on returns to T&V Extension in Kenya.* Policy Research Working Paper no.2098, Washington, D. C,U.S.A: The World Bank.

George, M., and Blummer, R., (1969). *Learning to learn from Experience*. Learning Across the Lifespan: theories, Research, policies. Symbolic interaction theory; USA, New York: Plenum Press.

Malunga, H., (2007). *Collective action and Market access to Smallholders.* A summary of findings; CAPR/IPR.

Henry, O.M., (2005). *Hand and multiple cases of Orphan crops Management.* Kenya Agriculture Research Institute, KARI.

Macharia, H.,(2013). *Influence of Selected Institutional factors on performance of CIG of farmers* in Gilgil, Division, Naivasha District, Kenya.

Huy, N.,(1999). *Social Identity and self- categorization processes in organization contexts*.London: Academic Management Press.

INTERPAKS (1996). *International Programs for Agricultural Knowledge System,* winter, Digest vol. 4, no. 1 University of Illinois, Urbana-Champaign.

INTERPAKS (2006). *International Programs for Agricultural KnowledgeSystem,* winter,Digest vol. 5, no. 1 University of Illinois, Urbana-Champaign.

INTERPAKS (2010). *International Programs for Agricultural Knowledge System,* winter,Digest vol. 6, no. 1 University of Illinois, Urbana-Champaign.

Jim, B., (2009). *Importance of Producer groups.* Becoming full partners in agricultural marketsand agro-enterprise.Michigan State University.

Otieno,J.O., (2010). *Influence of Common Interest Group strategy on Implementation of Crop Production Technologies;* Nyando District, Nyanza.

Jurgon, H., Chuma, E., and Connelly, M., (2002).*Learning together, Group theory,Participatory Extension;* A guide to an approach in development. Zimbabwe: HarareEducational press.

KARI. (2006). *Biotechnology in the developing world*: A case for increased investments in Orphan crops, KARI, Kenya.

Kathuri, N.J., and Pals D.A., (1993). *Introduction to education research*. Njoro, Kenya, Egerton University Education media Centre.

Kenya National Bureau of Statistics, (2009). *Census report for Nyando/Muhoroni District,* Kenya.

Krishworld, S.,(2008). *The Impulse of Indian Agricultural Marketing and Strategy*. Marketing Functionaries Agencies. New Delhi.

Lewis,and Ralph F.,(1997). *Interpreting Your statistical Analysis.* Provo, UT: BYU Testing Services.

Mael, G.,and Ashforth, S., (1995). *Organization identity and strategy as a context for individuals.* Vol. 13 Greenwhich: JAI Press.

Manrid J.K., Peter. A., and Wakhungu J.K., (2012). *Libaisi CIGs Youth Groups' contribution to Food Security in Western Kenya*. Ministry of Agriculture Success Stories, Western Kenya.

Mauyo L.W., J.M., Wanyama, C.M., Lusweti and J.N., Nzomo.,(2006). *Innovativeness of CIGsin North Rift Kenya;* A case study of Transzoia District: Nairobi Educational press.

Millie B.A., Antony N.,and Gedeon S., (2006*). Strengthening Farmer Organizations, The Experience of RELMA and ULAMP*. Published by the world Agroforestry, United Nations Avenue, Nairobi, Kenya.

Ministry of Agriculture, (2001). National Agriculture and Livestock Extension Programme(NALEP) - *Implementation guidelines, NALEP*, Kenya: Nairobi Educational Press.

Ministry of Agriculture, (2005).*National Agriculture Extension Policy*, National Agriculture and Livestock Extension Programme. NALEP, Kenya:Nairobi Educational Press.

Ministry of agriculture, (2006).*Economic Review of Agriculture, Kenya*: The central Planning and monitoring unit, Ministry of Agriculture.

Ministryof Agriculture, Livestock and Fisheries Department, (2007). .*Internal Impact Assessment of National Agriculture and Livestock Extension Programme Phase 1*, NALEP Kenya: Nairobi Educational Press.

Miwani Divisional Agriculture Office (2010). *List of High Value Traditional crop Common Interest Group members.* Miwani Office.

Mogeni, J., (2005). *The effectiveness of farmer field schools in group performance in up Scaling Agricultural technologies among smallholder farmers;* Thesis, Kenya: Kisii.

Mugenda, O., and Mugenda, A., (2003).*Research Methods.* Qualitative and quantitative approaches. Kenya: African Centre for technology studies.

Nyando Divisional Agriculture Office (2010). *List of high Value Traditional crop farmers in Nyando division.*

Robert G.D.Steel., and James H. Torrie (1996. *Principles and Procedures of Statistics.* A biometrical Approach. International Student Edition, Fong and Sons Printers PTE LTD

Richard, W.G., (2007A). *Economic and social impacts of the common interest group approach to public agricultural extension in Kenya.* Journal of development in sustainable Agriculture:159- 166.

Stubbs I., Mwangangi B., Muiruri P., and Mwangangi S,. (2012). *Strengthening the Viability of Common Interest Groups for Agribusiness development.* National Agriculture Extension Policy, NALEP, Government of Kenya.

Surguy, T., (2000).*Another view of "we" majority and minority group perspectives in common in-group identity.* University of Connecticut, U.S.A.: Storrs Centre CT.AA

Waweru, J., (1993). *Farmer's needs and problems in Agricultural production and role of biotechnology in solving problems.* Proceedings of the National Agricultural biotechnology Workshop Nairobi, Kenya: Industrial printing works limited.

World Bank, (1999). *World Bank, Agricultural Extension Projects in Kenya.* Impact Evaluation Report Number 19523.Washington DC, U.S.A: Operations Evaluation Department.

APPENDICES

INTRODUCTION

This is to inform you that a research study will be conducted in Miwani Division to compare high value traditional crops productivity between common interest group and non-common interest group members. The results of this study will be of help to both farmers and policy makers as it may enable planners to formulate strategies to improve the CIG approach and to enhance adoption and production of high value traditional crops (HVTCs), hence help reduce food insecurity. The researcher who is a student in Egerton University studying Community Studies and Extension course, hereby kindly request you to participate in the study by responding to the questions below. All the information given by respondents will be treated with confidentiality and will be used for research purposes only.

Appendix A: Questionnaire for CIG and non-CIG members growing high value traditional crops

Date of interview…… Case No. ……

SECTION I: Demographic information of CIG and Non-CIG members

Tick (√) the appropriate box according to your choice

1. Gender of respondent

a) Female ☐

b) Male ☐

2. Which age group do you belong?(Tick one)

a) Below 18 years ☐

b) 18 – 35 years ☐

c) 36 – 55 years ☐

d) 56 years and above ☐

3. What is your marital status? (Tick one)

a) Single ☐

b) Married ☐

4. How many are you in your family?

a) 1-3 ☐

b) 4-6 ☐

c) 7 and more ☐

5. What is the size of your farm? (Choose one)

a) Below 1 acre ☐

b) 1-2 acres ☐

c) 3 –4 acres ☐

d) 5 acres and above ☐

6. What is your education level? (Tick one)

a) Primary ☐

b) Secondary ☐

c) University ☐

d) None of the above ☐

Others (specify)……

7. What is your occupation(s) Please tick the appropriate answer(s)

a) Farmer ☐

b) Both farmer and public worker ☐

c) Farmer and business ☐

Others (specify)….. ……....

8. What is your monthly income from farming? (Tick one)

a) Below Ksh. 1,000 ☐

b) 1,001-4,000 ☐

c) 4,001- 10,000 ☐

d) 10,001 and above ☐

PART A: Questions for CIG Members only

SECTION II: High Value Traditional Crops (HVTCs) grown by CIG members.

Please tick where appropriate and fill in the blank spaces.

9. Which HVTC CIG(s) do you belong to? (Please tick the appropriate answer(s)

a) Cassava crop ☐

b) Sweet potatoes ☐

c) Arrow roots ☐

d) Local vegetables ☐

e) Sorghum ☐

Others (specify)……..

SECTION III: Technical Knowledge acquired by CIG members on HVTCs production

10. Have you been trained on aspects pertaining HVTC crops production

a) Yes ☐

b) No ☐

11. If yes, which of these areas were you trained on?

a) Land preparation ☐

b) Acquisition of farm inputs ☐

c) Planting ☐

d) Weeding. ☐

e) Pest and disease control ☐

f) Post harvest practices ☐

g) Value addition ☐

h) Marketing aspects ☐

Others (specify)……

12. Did you gain knowledge from the training(s)? ☐

a)Yes

b) No ☐

13. If yes, in which area(s) among these did you gain knowledge skills? (Tick one or more)

a) Land preparation ☐

b) Acquisition of farm inputs ☐

c) Planting methods. ☐

d) Weeding ☐

e) Pests and disease control ☐

f) Post harvest practices ☐

g) Marketing aspects ☐

Others (specify)……

14. Was the information adequately presented?

a) Yes ☐

b) No ☐

15. If No, on which aspect(s) of HVTC production would you like more presentations?

a) ……

b)……

c)……

d)……

SECTION IV: Participation in CIG activities and adoption of HVTCs by CIG members

16. How long have you participated in CIG activities? (Choose one)

a) Less than one year ☐

b) 1- 3 years ☐

c) 4- 6 years ☐

d) 7 years and above ☐

17. How many HVTCs did you start with? (Tick only one of the choices)

a) 1 ☐

b) 2 ☐

c) 3 ☐

☐

d) 3 and more

18. How many HVTCs do you currently grow? (Tickone)

a) 1 ☐

b) 2 ☐

c) 3 ☐

d) 3 and more ☐

19. What was your previous acreage for HVTCs? (Choose one)

a) Less than 0.5 acre ☐

b) 1-1.4 acres ☐

c) 1.5 -2 acres ☐

d) 2.5 and ore acres ☐

20. What is your current acreage for HVTCs? (Choose one)

a) Less than 0.5 acre ☐

b) 1-1.4 acres ☐

c) 1.5-2 acres ☐

d) 2.5 and more acres ☐

21. Give reasons for number 22 if there is a difference

a)……

b)……

c)……..

22. Which HVTCs (s) among these have you been able to adopt since you joined CIG(s)? (Choose one or more)

a) Cassava ☐

b) Sweet potatoes ☐

c) Arrowroots ☐

d) Sorghum ☐

e) Local vegetables ☐

f) Others (specify)……

SECTION V: Yields of High value traditional crops by CIG members

23. Do you keep records of your crop yields?

a) Yes ☐

b) No ☐

24. What were the previous yields / acre the HVTCs (s) you produced? (Fill in the table below)

Name of the crop	Yields per acre (Bags/Tons)
1.	
2.	
3.	
4.	
5.	

25. What are the current yields / acre the high value traditional crops you have adopted? (Fill in the table below)

Name of Crop	Yields per acre (Bags/Tons)
1.	
2.	
3.	
4.	
5.	

26. Wasthere increase in yields of the high value traditional crops produced?

a) Yes ☐

b) No ☐

27. If yes, what factors do you think may have contributed to the increase (List them down)

a)……

b)……

c)……

d)……

SECTION VI: Marketing of high value traditional crops by CIG members

28. Do you sell part of your crop produce?

a) Yes ☐

b) No ☐

29. If yes, where do you sell? (Choose one or more applicable)

a) Wholesale market ☐

b) At farm gate ☐

c) Retail market ☐

d) Through middlemen ☐

e) Others (specify)……..

30. What is your annual income from high value traditional crops enterprises?

a) Ksh. 1,000 and below ☐

b) Ksh. 1,001- 4,000 ☐

c) Ksh. 4,001- 8,000 ☐

d) Ksh. 8,001 and above ☐

31. What are the benefit(s) of being a CIG member of HVTC(s)? (Please tick one or more)

a) Increased yields ☐

b) Increased number of HVTCs enterprises grown ☐

c) Increased acreage(s) for HVTCs crops production ☐

d) Increased income ☐

e) Improved food security ☐

f) Increased knowledge ☐

g) Improved standard of living ☐

h) None of the above ☐

i) Others (specify)…….

SECTIONVII: Perception about CIG approach by CIG members

32. What do you perceive of the CIG approach in extension service with regard to HVTCs productivity in Miwani division?

a)……

b)……

c)……

d)……..

THANK YOU FOR YOUR CONTRIBUTION TOWARDS THIS STUDY

PART B: Questions for Non-CIG members only

Date of interview…… Case No. ……

SECTION II: High value traditional crops grown andtechnical knowledge acquired on HVTCs Production.

1. Which HVTC(s) do you grow? Choose one or more as it applies to you)

a) Cassava ☐

b) Sweet Potatoes ☐

c) Local vegetables ☐

d) Arrow Roots ☐

e) Sorghum ☐

Others (specify)…….

2. Do you have technical knowledge on HVTCs crops production?

a) Yes ☐

b) No ☐

3. If yes, in which area(s) among these do have knowledge on? (Choose one or more)

a) Land preparation ☐

b) Input acquisition and planting ☐

c) Planting methods ☐

d) Weeding ☐

e) Pest and disease control ☐

f) Post harvest management ☐

g) Value addition ☐

h) Marketing aspects ☐

Others (Specify)…….

4. Where did you gain the knowledge from? (Choose one or more)

a) From neighbors ☐

b) Through friends ☐

c) From the radio ☐

d) Magazines ☐

☐

e) Field days ☐

f) Shows ☐

Others (specify)……

5. In which area(s) do you need more training? (State below)

a) ……

b)……

c)……

d)……

SECTION III: Adoption of high value traditional crops(HVTCs) by non-CIG members

6. How long have you been growing HVTCs? (Choose one)

a) Less than one year ☐

b) 2- 3 years ☐

c) 4- 6 years ☐

d) 7 years and above ☐

7. How many HVTCs did you start with? (Tick only one of the choices)

a) 1 ☐

b) 2 ☐

c) 3 ☐

d) More than 3 ☐

8. How many HVTCs do you currently grow? (Choose one)

a) 1 ☐

b) 2 ☐

c) 3 ☐

d) More than 3 ☐

9. What was your previous acreage for the HVTCs produced? (Choose one)

a) Less than 0.5 acre ☐

b) 1-1.4 acres ☐

c) 1.5-2 acres ☐

d) 2.5 and more acres ☐

10. What is your current acreage for HVTCs? (Choose one)

a) Less than 0.5 acre ☐

b) 1-1.4 acre ☐

c) 1.5-2 acres ☐

d) 2.5 and more acres ☐

11. Give your reasons for your answer in number10.

a)……

b)…….

c)…….

d)……..

SECTION IV: Yields of High value traditional crop by non-CIG members

12. Do you keep records of your crop yields?

a) Yes ☐

b) No ☐

13. What are the yields / acre of the orphan crops you produce? (Fill in the table below)

Name of the Crop	Yields per acre (Bags/Tons.)
1.	
2.	
3.	
4.	

SECTION V: Marketing of high value traditional crops by Non CIG members

14. Do you sell part of your crop produce?

a) Yes ☐

b) No ☐

15. If yes, where do you sell? (Choose one or more applicable)

a) Wholesale ☐

b) Retail Market ☐

c) At farm Gate ☐

d) To middlemen ☐

e) Others (specify)……..

16. What is your annual income from high value HVTCs? (Choose one)

a) Kshs. 1,000 and below ☐

b) Ksh. 1,001-4,000 ☐

c) Ksh. 4,001-8,000 ☐

d) Ksh. 8,001 and above ☐

e) Others (specify)……

THANK YOU FOR YOUR CONTRIBUTION TOWARDS THIS STUDY

APPENDIX B: Calculations for the pilot-tested instruments

The results of the pilot-tested questionnaires were as calculated below:

KR21 Calculation for non-CIG Members

x	x^2
50	2500
43	1849
35	1225
39	1521
49	2401
33	1089
42	1764
27	729
64	4096
36	1296

$\Sigma x = 418 \quad \Sigma x^2 = 18470$

n = 10

K = 146

Mean = $\frac{\Sigma x}{n}$

= 418= 41.8

10

$$KR21 = \left(\frac{K}{K-1}\right)\left(1 - \frac{\bar{x}(K - \bar{x})}{K(\sigma^2)}\right)$$

but $\sigma^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n}$

$\sigma^2 = \underline{18470 - 17472.4}$

10

= 99.76

$$KR21 = \left(\frac{146}{145}\right)\left(1 - \frac{41.8(146 - 41.8)}{146(99.76)}\right)$$

$$KR21 = \left(\frac{146}{145}\right)\left(1 - \frac{4355.56}{14564.96}\right)$$

$$KR21 = \left(\frac{146}{145}\right)(1 - 0.700956267)$$

KR21 for Non-CIG members = 0.7057904

KR21 Calculation for CIG Members

x	x^2
58	3364
70	4900
60	3600
84	7056
75	5625
51	2601
47	2209
43	1849
59	3481
66	4356

$\Sigma x = 613$ $\Sigma x^2 = 39041$

n = 10

K = 173

Mean = $\frac{\Sigma x}{n}$

= $\frac{613}{}$

10

= 61.3

$$KR21 = \left(\frac{K}{K-1}\right)\left(1 - \frac{\bar{x}(K - \bar{x})}{K(\sigma^2)}\right)$$

but $\sigma^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n}$

σ^2 = 39041 – 37576.9

10

= 146.41

$$KR21 = \left(\frac{173}{172}\right)\left(1 - \frac{61.3(173 - 61.3)}{173(146.41)}\right)$$

$$KR21 = \left(\frac{173}{172}\right)\left(1 - \frac{6847.21}{25328.93}\right)$$

$$KR21 = \left(\frac{173}{172}\right)(1 - 0.729668406)$$

KR21 = 0.733910665

APPENDIX C: Research Permit

APPENDIX D: Research Authorization Letter by District Agriculture Officer

APPENDIX E: Research Authorization Letter by District Education Officer

APPENDIX F: Research Authorization Letter by District Commissioner