THE ROLE OF THE SMALLHOLDER FARMER GROUPS ON PRODUCTION, PROCESSING AND MARKETING OF MAIZE:

A CASE STUDY OF HOIMA DISTRICT, UGANDA

BY

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DECLARATION

I, Kasemire Shamim, declare that this Thesis titled "The Role of the smallholder farmer groups on production, processing and marketing of maize: A case study of Hoima District, Uganda" is my original piece of work and has never been submitted to any other University or higher institution of learning for any academic award.

Signature…………………   Date………………………

Kasemire Shamim

APPROVAL

I certify that this Thesis titled "The Role of the smallholder farmer groups on production, processing and marketing of maize: A case study of Hoima District, Uganda" is the original work of the candidate, Kasemire Shamim, and has been done under my supervision. This work has never been submitted to any institution of higher education for any award.

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DEDICATION

I dedicate this piece of work to my family and the INGENAES Project of University of Illinois at Urbana which was funded by USAID for serving as a great driving force that has helped me reach this major step in my life. I could not be where I am without their continuous support. Thank you so much and may the Lord bless them all abundantly.

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LIST OF ABBREVIATIONS AND ACRONYMS

CBO - Community Based Organization

CSA - Community Supporting Agriculture

CVI - Content Validity Index

ECA - East and Central Africa

FGD - Focus Group Discussion

GDP: - Gross Domestic Product

HODFA - Hoima District Farmers' Association

IFAD - International Fund for Agriculture Development

INGENAES - Integrating Gender and Nutrition within Agricultural Extension Services

MAAIF - Ministry of Agriculture, Animal Industry and Fisheries

MPS - Market Price Support

NAADS - National Agricultural Advisory Services

NARO - National Agricultural Research Organization

NGOs - Non-Government Organizations

PSFU: - Private Sector Foundation Uganda

SPSS - Statistical Package for the Social Sciences

UBOS - Uganda Bureau of Statistics

USAID - United States Agency for International Development

UNHS - Uganda National Household Survey

ABSTRACT

Maize farmers in Hoima District have formed groups to overcome the challenges of low production, processing and marketing of maize due to lack of adequate extension support, inadequacy of transport facilities, limited access to inputs and output market. However, studies have shown that even when the farmers form groups, the challenges that farmers face as individuals continue to be experienced in their farmer groups. The challenges listed if left unaddressed, have the potential of causing more decline in maize productivity, incomes and consequently food insecurity. To come up with improved status of maize productivity and marketing among the members of the farmer groups, the study examined the role of farmer groups in production, processing and marketing of maize in Hoima District. The major objective was to examine the role of the participating members and further to establish the challenges faced so that strategies for better performance are suggested. Specifically, the study set out to find out the roles of smallholder farmer groups in production, processing and marketing of maize; identify the factors that enable smallholder farmer groups to improve the marketing of maize produce; and identify the challenges faced by smallholder farmer groups in a bid to uplift output, food security and incomes. A cross sectional survey design was adopted. Data were collected from the members of 4 selected farmer groups, Hoima District Farmers' Association and Hoima District Local Government Production and Marketing Officials giving a sample size of 140 respondents. The respondents were selected using simple random and purposive sampling techniques. Questionnaires, interview guide, Observation Guide, Focus Group Discussion guide and Documentary review checklist were used to collect data from the study sites. Qualitative data were presented using narrative text and verbatim quotations. The study findings indicated that to a great extent, the farmer groups have boosted the productivity of maize among farmers. Quantitative data were analyzed using descriptive statistics (percentages and means); inferential statistics were correlation and chi-square tests. Majority of the farmers agreed that their group maize production increased per season to 2 metric tonnes from 1 tonne per individual farmer. Chi- square result shown in Table 4.8 obtained was χ^2=19.379 df= 2, p=.000, meaning that there was a significant relationship between membership in farmer's group and improved marketing of maize produced. Table 4.5 shows that the correlation coefficient for group factors and maize yield was r= .643* p=0.012<0.05 meaning that there was a positive correlation between farmer group factors and maize yields The group factors that were behind the boost included joint planning, access to better markets because of collective bargaining power, adoption of better and improved maize varieties such as the latest Longe 11 and collaborative relationships with international donor agencies such as Abi-Trust and United States Agency for International Development. These have not only boosted farmer skills through training but have also linked the farmer groups to potential markets. It was also found out the success registered by the farmers was in accessing better markets, improved production and indirect benefits from networking with international organizations. Nevertheless, there were a series of structural and group-based challenges such as poor leadership hampering the effective performance of the farmers groups. The study concluded that farmer groups have boosted maize production in Hoima District. The study recommended the need for provision of extension services to all the farmer groups; need by the government to upgrade the feeder roads in rural areas; and the need for the government to engage monitoring committees at the District and sub county levels to protect the farmers from being cheated by seed dealers and others.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The world-wide consumption of maize is more than 116 million metric tonnes, a testimony to the fact that there is a high consumption of maize globally. In Sub-Saharan Africa, 50% of the population consumes maize while the entire African continent accounts for 30% of global Maize consumption (Trauger, Dorward & Kydd, 2009).

The United States produces 40% of the world's harvest; other top producing countries include China, Brazil, Mexico, Indonesia, India, France and Argentina. Worldwide production was 817 million metric tonnes in 2009—more than rice (678 million metric tonnes) or wheat (682 million metric tonnes). In 2009, over 159 million hectares (390 million acres) of maize were planted worldwide, with a yield of over 5 metric tonnes per hectare (80 bu/acre). Production can be significantly higher in certain regions of the world; 2009 forecasts for production in Iowa were 11614 kg/ha (185 bu/acre). There is conflicting evidence to support the hypothesis that maize yield potential has increased over the past few decades. This suggests that changes in yield potential are associated with leaf angle, lodging resistance, tolerance to high plant density, disease/pest tolerance, and other agronomic traits rather than increase of yield potential per individual plant (Trauger, *et al*., 2009).

One would imagine that a continent that has a heavy maize consumption rate will be a major maize producer but on the contrary, Africa accounts for only 6.5% of the global maize production with Nigeria being the largest African Maize producer; her production is slightly over

10 million metric tonnes of Maize, followed by South Africa. However it is considerably small when compared to the USA's corn production (384 million metric tonne) (Okello, 2005).

If Africa produces very little and consumes so much, then it confirms to us that there is a heavy reliance on importation to bridge the production deficit which is why Africa's total consumption of maize accounts for 28% of the global maize imports (Okello, 2005).

It is predicted that by 2050, the demand for maize in the developing world is expected to double. This in itself is a good sign for anyone in the Maize value chain especially the local and cross-border trader.

Maize is the most highly cultivated crop with about 86 per cent of Uganda's agricultural households (Uganda Bureau of Statistics, 2014). Maize is the number-one staple food for the urban poor, in institutions such as schools, hospitals and the military. Also, the crop is the number-one source of income for most farmers in Eastern, Northern and North-Western Uganda (Stephenson, Ferris, Holland, & Nordberg, 2006), as it presents an opportunity to increase their earning exponentially.

The concept of farmer groups for agricultural promotion, originally known to be community supporting agriculture (CSA), originated in the 1960s in Switzerland and Japan, where consumers interested in safe food and farmers seeking stable markets for their crops including maize came together in economic partnerships (Harper, 2008)

According to the World Bank (2000), most development initiatives working through farmer groups are specifically targeting the poorest people engaged in the production and marketing of crops such as maize. Additionally, innovation platforms and intermediaries can help farmer groups cope with emerging agricultural challenges, which include adoption of innovations

needed by multi-stakeholders in production and marketing. Therefore, such groups as the smallholder farmer groups need a flexible attitude and process skills in the navigation of changes in their business (Abaru, Nyakuni & Shone, 2006).

In recent years, the role of smallholder agriculture has been greatly recognized and demonstrated for increasing production of staple food crops for food security and income through more maize production, processing and marketing. Both the donor community and government have pledged to support provision of requirements for interventions to generate agricultural and economic growth (Diao &Hazell, 2004). In post-structural adjustment Africa, this growing recognition has led to the concepts of theory and practice that now define the major policy directives concerned with boosting Africa's faltering agricultural economics (Resnick, 2004). First, agricultural development will not occur without engaging smallholder farmers accounting for the overwhelming majority of actors in this sector. Secondly, farmer groups must be made central to any strategy to revitalize not only the agricultural sector, but also the economy (International Fund for Agriculture Development, IFAD, (2008); Wiggins, 2000).

Farming in groups is a crucial economic activity in developing countries. It is recognized that strengthening farmers' group activity is a key driver to reduce poverty, ensure food security and enhance economic development (Ouma, *et al.*, 2011). With that said, farmer groups are still too vulnerable to shocks which include price and weather fluctuations; the risk of entering new markets for many is an overwhelming challenge. The impact of climate change and increasing market volatility will make agriculture even more exposed to these risks in the future, hampering much-needed investments (Wambugu & Kiome, 2001). Agricultural policies and poverty reduction strategies clearly need to be more focused. They would not work without an explicit inclusion of the support for smallholders, to get them into local and international markets.

Commercialization of smallholder agriculture remains one of the major challenges in Africa. Studies suggest that one of the major constraints to commercialization of smallholder agriculture is market access (Poulton, Kydd & Dorward, 2006). Past efforts to improve farmer groups' access to markets through market reforms have largely been ineffective due to lack of enough cooperation and organization among farmers in their groups. Consequently, majority of African farmer groups still produce largely for subsistence needs. Majority produces small marketable surpluses and face thin markets. Sseguya, Mazur and Flora, (2018) established that households with bridging and linking social capital, characterized by membership in groups, access to information from external institutions, and observance of norms in groups, tended to be more food secure. Households with cognitive social capital, characterized by observance of generalized norms and mutual trust, were also more food secure than others. Therefore, development interventions which focus on strengthening community associations and networks to enhance food security should support activities which enhance cognitive social capital and human capital skills. Such activities include mutual goal setting, trust building and clear communication among others.

Magingxa and Kamara (2003) noted that farmer groups are the drivers of many economies in East Africa even though their potential is often not brought forward. Smallholder farmers are defined in various ways depending on the context, country and even ecological zone. Often the term 'smallholder' is interchangeably used with 'small-scale', 'resource poor' and sometimes 'peasant farmer'. In general terms, smallholder only refers to their limited resource endowment relative to other farmers in the sector. Smallholder farmers are also defined as those farmers owning small-based plots of land (0-2 hectares) on which they grow subsistence crops and one or two cash crops relying almost exclusively on family labour.

The success of rural smallholder farmer groups depends on social capital (the level of cooperation or networking among its members) among other factors. Serageldin and Grootaert (2000) argue that the capacity to fulfill the farmers' interests depends on the social structures internal to the group, structures that organize the formulation and enforcement of rules, making and implementation of collective decisions and actions.

Agriculture remains the backbone of the economies of most African Countries. In Uganda, 85% of the population is engaged in agricultural production which contributes 42% of the National Gross Domestic Product (GDP) 80% of the export earnings and employs 90% of the labour force (UBOS, 2014). According to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) Development Strategy and Investment Plan 2005/2008, the main Agriculture sub-sectors include crops contributing about 80%, livestock contributing 13% and fisheries contributing about 6%. Over 95% of the farmers are smallholder farmers. Each of their farms is of an average size of 2 hectares. Majority of these smallholder farmers have rich indigenous knowledge that has sustained their livelihoods. food security as well as land productivity for hundreds of years with very little or no use of artificial fertilizers, pesticides and veterinary drugs.

The importance of rural credit services can be best understood by examining their potential contribution to the development of the agricultural sector. Agriculture forms a significant part of the lives of the rural households, who in the case of Uganda constitute about 85% of the population (UBOS, 2014). Many of the agricultural activities are spread over time for example; adoption of a new technique or a new crop requires investment in the current period with payoffs in the future. Much of the industrial activity in the country is agro-based. Even though its share in total GDP has been declining, agriculture remains important because it provides the basis for

growth in other sectors such as manufacturing and services. Being the largest employer, the majority of women (83 per cent) is employed in agriculture as primary producers and contributes 70-75 per cent of agricultural production. In the face of the global financial crisis, agriculture is contributing a lot of foreign exchange revenue from regional trade and therefore improving the country's balance of payments position, and in the process helps to stabilize depreciation of the shilling (UBOS, 2014).

Out of about 34.9 million Ugandans, 85% live in rural areas of which 73.3% are engaged in subsistence agriculture (UBOS, 2014). Most of the agriculture is characterized by small land holdings with a few isolated commercial holdings (Musiime, Keizire & Muwanga, 2005). In addition to supporting livelihoods, agriculture sector contributes to the national revenue. In 2009, the sector provided about 70% of the employment in the country and contributed to 90 percent of the total export (UBOS, 2010). However, the share of the agriculture sector to GDP has continued to decline from 20.2% in 2004/05 to 14.7% in 2009/10 and 13.9 % in 2011/12 (Mugisha, Diiro, Ekere, Langyintuo & Mwangi, 2011). Even though its share in the total GDP has been declining, agriculture remains important because it provides the basis for growth in other sectors such as manufacturing and services (Government of Uganda, 2010).

Agricultural export production in Uganda hinges on the efforts of rural producers and processors who typically receive the least benefits from the marketing and processing of their products. Nurturing and building the capacity of farmers' groups is one way of improving quality, profitability and marketing efficiency. Moreover, because Uganda is landlocked country, regional development initiatives are likely to have significant returns for markets and for efficient transportation and the regulation of product quality. Clearly the effective implementation of policies to expand the access of services to encourage agricultural

exports urgently needs to be addressed to benefit smallholder farmers as they produce and process the goods (Sebatta, Mugisha, Katungi, Kashaaru, & Kyomugisha, 2014).

The study focused on maize because it is an important crop in Uganda. It is the most highly cultivated crop with about 86 per cent of Uganda's agricultural households (UBOS, 2014). Maize is ranking third in the importance among the main cereal crops (finger millet, sorghum and maize) grown in Uganda (Adong, Muhumuza, & Mbowa, 2014). Maize is one of the main crops grown for food, feed and income in Uganda by over 70 per cent of the population (Asea, Serumaga, Mduruma, Kimenye & Odeke, 2014). Maize is the number-one staple food for the urban poor, in institutions such as schools, hospitals and the military. Besides, the crop is the number-one source of income for most farmers in Eastern, Northern and North-Western Uganda (Ferris et al., 2006).

Although the role of agriculture in poverty reduction and overall growth in Uganda is well recognized, investment in the sector remains minimal, at 5% and less than 10% as agreed in the Maputo Declaration (UBOS, 2014). The slow pace of socio-economic transformation in Uganda can therefore be attributed to the neglect of the agricultural sector as an engine of growth (Tibaidhukira, 2012). Many studies from the literature have suggested that modest increases in maize production are largely due to expansion in cultivated land, access to credit services, extension services, access to market services and growth of institutions (Gill &Pratt, 2008).

However, few studies have addressed the access to credit, extension, market services and maize productivity and yet the Government of Uganda and her partners have continuously invested a lot of funds, from the World Bank funded Agricultural Extension Project in 1992 to the current NAADS phase II, agricultural productivity has slowly grown with the maize

crop fluctuating between seasons (Delgado, 2003; Fernandez-Cornejo, 2006; Okoboi, 2011; Okoboi, Kuteesa, & Barungi, 2013).

In Uganda, some of the main characteristics of maize production systems of smallholder farmer groups are simple and outdated technologies, low returns, high seasonal labour fluctuations and women playing a vital role in production (United States Agency for International Development, USAID, 2013). Smallholder farmer groups differ in individual characteristics, farm size, resource distribution between food and cash crops, livestock and off-farm activities, their use of external inputs and hired labour, the proportion of food crops sold and household expenditure patterns. Poor yields may be one of the reasons why urban and rural households either abandon or are uninterested in maize production and marketing. Therefore, there is a need to significantly increase the productivity of smallholder farmers to ensure long term food security. This can be achieved by among others encouraging smallholder farmer groups to pursue sustainable intensification of maize production through improved inputs (Jjuuko, 2008).

According to Lukwago (2010), declining agricultural performance is a major driving force behind growing poverty among Uganda smallholder farming populations including those in Hoima District. Therefore, recovery from poverty and food insecurity among the vulnerable poor rural farming populations of Hoima induces a risk-minimizing conservative attitude towards farming and livelihoods systems through the participation of smallholder farmer groups.

According to Kalyegira (2010), almost every household in Hoima District produces maize every season for both consumption and for sale. Therefore, maize is greatly demanded to provide for households and thousands of workers employed in the large scale sugar cane plantations in Bunyoro sub region where Hoima is located. The large existing market in the sub region for

maize has induced the farming households to engage in extensive and intensive production of maize (Kalyegira, 2010). In this context, the potential role of a smallholder farmer in increasing the maize productivity, processing and marketing is opportune in meeting the demand. It is within this background that the study examined the role of smallholder farmer groups in production, processing and marketing of maize in Hoima District.

1.2 Statement of the Problem

Although the role of agriculture in poverty reduction and overall growth in Uganda is well recognized, investment in the sector remains minimal, at 5% or less than 10% as agreed in the Maputo Declaration (UBOS, 2014). The slow pace of socioeconomic transformation in Uganda can therefore be attributed to the neglect of the agricultural sector as an engine of growth (Tibaidhukira, 2012). Many studies from literature have suggested that modest increases in maize production are largely due to expansion in cultivated land, access to credit services, extension services, access to market services and growth of institutions (Gill, *et al.,* 2008). Nonetheless, maize production, processing and marketing remain unsatisfactory and unprofitable to benefit farmers who are largely individual farmers.

Even though the formation of groups in production has been encouraged throughout Uganda, its success in raising agricultural productivity is highly variable because of differences in extension support (Agole, 2005). According to the Hoima District Agricultural Performance Report (2014), the number of registered smallholder farmer groups with the District Community Based Organization (CBO) increased from 18 in 2005 to 231 in 2014 but little is known or documented about their performances in raising agricultural productivity, benefits to members and in revealing what structural factors or characteristics contribute to their effective performance. Group projects including those in maize production, processing and marketing are generally

beset by problems resulting from low participation, lack of adequate extension support, limited access to inputs and output market, lack of processing, lack of transport, poor farmer empowerment and weak government programmes, thus declining agricultural performance. These challenges make it necessary to involve farmers in sustainable development activities through forming smallholder farmer groups (World Bank, 2002). Therefore, it is within this context that the study sought to explore the role of smallholder farmer groups in maize production and marketing in Hoima District.

1.3 Purpose of the Study

The purpose of the study was to investigate the role of smallholder farmer groups on the production, processing and marketing of maize in Hoima District.

1.4 Objectives of the Study

The study was guided by the following objectives;

a) To find out the role of smallholder farmer groups on production, processing and marketing of maize.
b) To identify the factors that enable smallholder farmer groups to improve the production, processing and marketing of maize.
c) To identify the challenges faced by smallholder farmer groups in a bid to uplift maize output, food security and incomes.

1.5 Research Questions

a) Does membership to a farmer group increase productivity of maize?

b) What are the factors that enable smallholder farmer groups to improve the production, processing and marketing of maize?

c) What are the challenges faced by smallholder farmer groups in a bid to uplift maize output, food security and incomes?

1.6 Research Hypotheses

The following hypotheses were tested at 0.05, level of significance.

a) Smallholder farmer groups have no significant role on maize production.

b) Smallholder farmer groups have no significant role on maize processing.

c) Smallholder farmer groups have no significant role on the marketing of maize produce.

1.7 Significance of the Study

The study generated knowledge, skills and practices that would help farmer groups in Hoima District to improve their roles on the production, processing and marketing of maize. The study would also help the District leaders to know and support the smallholder farmer groups in their roles to increase maize productivity and develop agricultural sector in the District.

Results of the study were hoped to encourage the agricultural stakeholders and policy makers in formulating appropriate policies, identifying technologies and training, which suited the standards of smallholder farmers. They further provided the status of maize production, processing and marketing levels among the farmers in Hoima District which was the basis of

improving maize productivity that would ensure food security and output of competitive products for better incomes.

1.8 Scope of the Study

1.8.1 Geographical scope

The study was carried out in Hoima District. The district is bordered by Buliisa District in the north, Masindi District in the north east, Kyankwanzi in the east, Kibaale in the south and the Democratic Republic of Congo across Lake Albert to the west. Hoima District is endowed with significant human and natural resources (Oil and Gas plus fertile soils) that can be exploited for the development of the district and the country. The District is endowed with agricultural and economic opportunities that can be utilized for the economic benefits of the local citizens thus poverty reduction. Hoima district has got four sub-counties of Bugahya, Buhaguzi, Kigorobya and Hoima municipality. The findings of this study were obtained from four farmer groups, each belonging to one of the above mentioned subcounties an implication that all the four subcounties were involved in this study. The farmer groups were Kibaire (42 members), Bugambe (40 members), Kigorobya (43 members), Bugahya (50 member) and Buhaguzi (45 memebrs). Altogether, the study target population comprised of 220 farmers from which a sample of 140 was selected.

1.8.2 Content Scope

This study examined the role of smallholder farmer groups in production, processing and marketing of maize in Hoima District. This covered particularly the role of smallholder farmer

groups in maize production, processing and marketing and also examined the challenges faced by smallholder farmer groups in a bid to uplift maize output, food security and incomes.

1.8.3 Time Scope

The study was done in a period of six months that is, from March to July 2017 as this was the period when very many farmer groups were actively involved in production, processing and marketing of maize. This helped the researcher to get timely information secured from field data for understanding the study variables.

1.9 Assumptions

The assumptions formulated to direct the study are the following:

i) Smallholder farmer groups engaged in the production, processing, and marketing of maize operated under similar conditions in Hoima District.

ii) Extension services were uniformly available to all farmers and their groups to ensure that they were using improved inputs, do value addition and get appropriate market information.

1.10 Limitations

The researcher encountered the following limitation during the study:

Weather changes were a challenge. Rain disrupted a number of appointments and meetings. The researcher overcame that by using protective gear for self. For respondents the meetings were rescheduled and relocated to the respondents' homes for shelter to enable meetings and

discussions to continue. During too much sunshine and other weather conditions, meetings and discussions took place under well-arranged tree shades.

1.11 Operational Definitions of Concepts and Terms

Agriculture Development: Lundy, Ostertag & Best (2002) state that Agricultural development are services which are geared towards improving and maintaining smallholder agricultural production and performance measured by output, food security and group member's incomes. Agriculture development should be such that it brings about a revolution in the agriculture industry to give birth to an agriculture which is profit giving and at the same time eco-friendly. Agriculture development means providing assistance to the crop producers with the help of various agricultural resources.

Extension Service: Service for the smallholder farmers and others, directly or indirectly engaged in agriculture production, to enable them to adopt improved practices and technologies in production management, conservation and marketing including processing (Okori, 2011)

Level of Education: Level of formal education that a smallholder in a farmer group has acquired.

Product Market: This outlet through which a smallholder farmer groups sell the produced including processed maize (Kalyegira, 2010).

Smallholder Farmer groups: Farm households that own or/and cultivate less than 2.0 hectares of land or schemes involving multiple individuals not related by kin or employment relationships, who share resources for farming (Stockbridge, Dorward, & Kydd, 2003)

Stakeholders: Those persons / entities that contribute to, and derive benefits from, the country's agriculture system (Sseguya, et al., 2018).

Production:

Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (the output). It is the act of creating an output, a good or service which has value and contributes to the utility of individuals (Saari, 2006).

Marketing:

Marketing is original meaning which referred literally to going to market with goods for sale. From a sales process engineering perspective, marketing is a set of processes that are interconnected and interdependent with other functions" of a business aimed at achieving customer interest and satisfaction (Paliwoda, Stanley , Ryans & John 2008).

Processing:

Process is another element of the services marketing mix .There is a number of perceptions of the concept of process within the business and marketing literature. Some see processes as a means to achieve an outcome, for example to achieve a 30% market share, a company implements a marketing planning process (Ahmad & Rizal, 2003).

1.12 Conceptual Framework

Independent Variables

Dependent Variables

Farmer Groups
Input Factors
- Land
- Labour available
- Money/funds
- Seeds
- Agro-Chemicals
- Tools &Equipment
- Machines/transport

Size of the Group
- Number of people in a group
- Number of active members

Group Characteristics
- Group Savings per season/income
- Level of cohesiveness/information sharing
- Collective decision making
- Education of group members

Group Activities
- Group knowledge on maize production
- Group skills/ practices on maize production

Output activities on maize
Production
- Kg/hectare/person/group

Processing
- Kgs processed into flour
- Kgs of maize processed into animal feeds

Marketing
- Sales in kg/ person/group
- Income in Ushs/person/group

Food security
- Access to food in kg/person/group /season
- Availability of food in kg /person/season
- Food Utilization per day in kg/person/group/season

Challenges farmers face
- Infrastructure
- Price variations
- Seasonal variation
- Gender
- Group duration
- Ages of member

Intervening variables

Figure 1.1: Conceptual framework showing the relationships of variables among smallholder farmer groups in maize production, processing and marketing in Hoima District

Sources: Huber, (2001) and Armstrong (2006).

In Figure 1, it is stated that the smallholder farmer groups, within Hoima District, are the main independent variables while maize production, processing, marketing and food security are the main dependent variables. This means that the adoption and implementation of smallholder farmer groups' activities on a routine basis encourage and promote maize production according to the literature.

The availability of land, labour, funds, seed, agro-chemicals tools and equipment such as machines to the smallholder farmer groups make it possible to produce more maize hence enough food in their household and more income. When the farmer groups have enough of the factors listed especially money, they may increase the area of land under cultivation and that increases the possibility of getting more yields at the end of the season.

The size of farm groups which includes the number of people in a group and the number of active numbers. This helps the group to increase on their productivity and this therefore increases the income of the individual/ group. The more land, money, equipment, tools, and labour the more likelihood of increased yields and funds for each individual farmer/group. This will increase the food security of the smallholder farmers and individual farmers and as a group they can market their produce because they would be having leverage in the market because of the large quantity. The performance of the farmer groups would largely depend on their characteristics, which may include; their transparency and accountability to save, level of unity cohesiveness, information sharing, collection decision making and members level of education. Consequently, the quality of activities carried out will be guided by both the farmer group size and its characteristics.

This whole relationship of independent and dependent variables is affected by the intervening variables namely; seasonal variations, price variations, infrastructure, gender and age of the

group. The improvement in infrastructural facilities especially the feeder roads eases the transportation of maize produce from farms to markets as well as inputs and outputs which influence agricultural development in Hoima District. The poor transport and storage infrastructure affects farmers because they take long to reach the market and this makes farmers not access the markets. Price variations discourage farmers from growing maize because of high supply and seasonal variations arising from climate change which affects the output of maize, most farmers rely on rain; gender affects maize production because women do not own land and ages of members affect output since young people do not own land. All these intervening variables were supposed to have no effect on the dependent variables in the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature reviews the works already written about the variables under investigation. It supports the researcher's attempt to address the gaps in the existing knowledge. Several sources were consulted and the researcher critically analyzed and appraised the various authors for literature read and related to the study variables. The chapter is therefore organized into sub variables in the conceptual framework as presented in the ensuring sections.

Smallholder farmer groups are grass root farmer institutions organized for a common farming interest. A community can build strong local and national organizations and a network that can help in fostering agricultural development (Trauger, *et al*., 2009).

2.2 Maize

Maize is the basis for food security in some of the world's poorest regions in Africa, Asia, and Latin America. The global world production of maize exceeds 780 million metric tonnes per year, compared with almost 500 million metric tonnes of wheat and just less than 400 million metric tonnes of rice. The USA is by far the biggest producer (over 330 million metric tonnes in 2007; 42% of the world production), occupying double the area of any other crop planted in the country. It should however be noted that a major part of this is used for fodder and production. In the world ranking the USA is followed by China (152 million metric tonnes), Brazil (52 million metric tonnes), Mexico (23 million metric tonnes) and Argentina (21 million metric tonnes) (Lundy, Ostertag, & Best, 2002).

The crop provides over 20% of total calories in human diets in 21 countries, and over 30% in 12 countries that are home to a total of more than 310 million people. Production of maize,

especially in the tropical regions, is affected by a number of constraints, including an array of abiotic and biotic stresses, poor soil fertility, lack of access to key inputs (especially quality seed and fertilizers), low levels of mechanization, and poor post-harvest management (Yorobe & Smale, 2012).

The resultant maize yields in many of the sub-Saharan African countries, where maize is the most important staple food, are often extremely low, averaging approximately 1.5 metric tonnes per hectare about 20% of the average yield in developed countries and yields in several Asian countries are still below 3 metric tonnes per hectare. In addition, one-third of all malnourished children are found in systems where maize is among the top three crops (Trauger, Dorward, & Kydd, 2009).

Maize is one of the main crops grown in Eastern and Central Africa (ECA) as a staple food by over 70% of the population (Asea *et al*, 2014). Maize was introduced in Uganda in 1861 and has since become a major crop of the farming system, ranking third in importance among the main cereal crops (finger millet, sorghum and maize) grown in the country (Adong *et al.,* 2014). Maize is the highly cultivated crop with about 86 per cent of Uganda's agricultural households (UBOS, 2014). Also, the crop is the number-one source of income for most farmers in Eastern, Northern and North-Western Uganda (Ferris *et al.,* 2006).

Uganda's small-scale farmers have traditionally cultivated maize for food and for income generation. Maize is an important crop grown in most parts of Uganda for food, feed and income (Asea *et al*, 2014). Maize being one of the major crops regionally exported was a stepping-stone towards poverty eradication (Private Sector Foundation Uganda (PSFU), 2005) but not achieved due to high post-harvest losses. The maize sub-sector is estimated to provide a livelihood for

about 3 million Ugandan farm households, close to 1,000 traders and over 20 exporters (UBOS, 2010).

Uganda maize production however is dominated by smallholder farmers whose production is generally characterized by small farm area (0.5- 2 ha) (MAAIF, 2013), low yields (1.0 -1.8 MT/ha) and high production costs and consequently low returns. Unfortunately, the quality standards of maize grain produced in Uganda is generally low and a lot is lost during the process of harvesting, transport, storage and processing. The major maize growing sub-regions in Uganda are Busoga (eastern) region and Bunyoro (mid- western) region (MAAIF, 2013).

2.3 Maize Production, Processing and Marketing in Hoima District

Hoima District has a population of 287,906 males and 285,080 females (UBOS, 2017) and the major economic activity is farming with 86.29% of the total households engaged in farming, both crop and livestock (UBOS, 2017). The highest proportions of the households grow maize at a rate of 57.2% of the total households in the Bunyoro sub region (UBOS, 2017).

According to Kalyegira (2010), almost every household in Hoima and Masindi Districts produces some maize every season. This is largely because maize has for the last one century been the key staple food in Bunyoro sub region where Hoima is located. The significance of maize production is attributed to large scale sugar cane plantation farming in Bunyoro region and around that has employed thousands of workers since 1970s. The market for maize as the main food source for the plantation workers has always induced the farming households to engage in extensive and intensive production of maize for sale (Kalyegira, 2010). In a related study, Bangizi (2015) established that maize production is most pronounced in Bunyoro sub region compared to other parts of Western and South Western Uganda. Farmers in the sub region use

ox-ploughs and tractors especially those with big plots of land. However, the same study by Bangizi established that there were marketing inequities among the farmers especially those growing maize far away from the maize collecting centres because of high transaction costs. This means that marketing of maize on individual basis is a daunting problem for smallholder maize farmers especially in Hoima which tops in maize production for Bunyoro sub region (Bangizi, 2015).

Hoima District Production and Marketing Annual Report (2014) indicated that maize farmers have continuously used soil amendments to bolster their productivity. The same report, however, mentions that while organic fertilizers such as Farm Yard Manure are most encouraged by the extension service workers, there is high illiteracy among smallholder farmers in Hoima District leading to misuse and misapplication of the fertilizers. Equally the costs of acquisition of organic fertilizers were found to be a divorcing factor which has affected the consistence of the farmers in applying organic fertilizers. The Annual Report further highlights that marketing of maize is done by groups for those farmers that belong to vibrant farmer groups while those that belong to disorganized groups or operate on individual basis carry out the marketing activities on their own. Table 2.1 provides a summary of maize production in Hoima District in 2015.

Table 2.1: Maize Production Statistics for 2015

Sub county	Number of Maize producing Households	Average Annual Production (in metric tonnes)	Average Quantity Sold (in metric tonnes) Metric tonnes	%	Average quantity Consumed (in metric tonnes) Metric tonnes	%
Bugahya	21650	2130	1523	31	607	22
Buhaguzi	12531	1453	987	20	466	16
Kigorobya	53671	3687	2103	43	1584	56
Hoima Municipality	6541	452	297	6	155	6
Total	**74038**	**7722**	**4910**	**100**	**2812**	**100**

Source: Hoima District Production and Marketing Department (2016)

As shown in Table 2.1, maize producing farmers in Hoima sold approximately 64% of the maize produced in 2015 while 36% of the output was retained home for food security reasons. Therefore, maize production is both for sale and food security purposes. According to UBOS (2017), there is increased production of maize in Hoima District and so is the estimated increase in income from the crop in the year 2014 compared to the previous years. UBOS (2017) further highlights that maize is the main income earner for all the farming households.

Otim (2014) established that processing and marketing of maize in Hoima was problematic because of the bad roads that hinder movement of large trucks and the choice to sell maize right from the garden before it is ready for harvest and the poor post-harvest handling techniques employed on post-harvest handling. Otim (2014) further established that instead of using the prescribed tarpaulins for drying, some farmers dried the maize on bare ground which affected the quality. Such maize cannot compete with that dried on modest standards such as the case with Hoima District Farmers' Association that owns a drying machine.

Otsuka, & Larson (2015) reveals that value addition capacity of maize farmers in Hoima district continues to be wanting. Much as loans and grants have been extended to the maize farmers in the District, the farmers seem to be diverting the accessed funds to other activities other than value addition. Kiiza (2013) noted that farmers in Hoima District including those of maize were so reluctant in adopting modern technology for enhancing their operations leading to continued production of sub-standard output. While Kiiza does not mention processing technology among the technologies least adopted by the farmers, Nabende (2016) established that there are very few farmers in Busoga and Bunyoro sub region who have embraced maize processing technology. As a result, their produce fetches low price as it is largely bought by the non-maize producing middlemen who own processing machines and convert the cheaply bought maize into bran and

maize flour which they package and brand and later sell at dear prices, sometimes to the very maize farmers themselves especially those engaged in poultry and piggery in production.

2.4 Role of Smallholder Farmer Groups in production, processing and marketing of maize

This sub section looked at the role of smallholder farmer groups in production, processing and marketing of maize.

According to Uganda Census of Agriculture by UBOS (2008/2009) stated that the estimated number of plots under maize was 2.9 million Shillings. Out of these, 1.4 million (47.1%) were of pure stand while 1.5 million (52.9%) were of mixed stand. The regional figures indicate that, the Northern Region with 63.1 percent had the highest percentage of its maize plots in pure stand followed by the Western Region (47.3%) while the Eastern Region had the least (40.7%). The national Market Price Support (MPS) was estimated to be 0.35 Ha. The Northern Region had the highest estimated MPS of 0.39 Ha followed by the Central Region with 0.37 Ha while the Eastern Region had the least (0.32 Ha). The estimated MPSs for Uganda National Household Survey 1995/96, UNHS 1999/00 and UNHS 2005/06 were 0.20, 0.28 and 0.18 Ha respectively.

Maize is a significant food source for much of the world's population and represents a vehicle for vitamin and mineral deficiency intervention. There are several industrial processes that generate a wide variety of maize products to fulfill consumers' habits and preferences. Many products of the industrial dry maize–milling processes may also be produced locally on a small scale as well as in the home. The materials, processes, and equipment are readily available, but it is important to consider that the number of nutrients removed or altered through home or small-scale industry processing may vary widely. Proper assessment of population needs and understanding of industrial capability, products, and losses are needed to determine the viability of maize product fortification (Eckhoff, 2010).

The Biggest processing actors for maize are mill owners who are in the towns in the area with the majority in Mbale, Jinja, Tororo and Iganga towns. Other players in the processing are manufacturers of bags who provide sacks for bagging, transporters and finance institutions who give soft loans to the processing companies. Farmers in most cases market their crops without processing it (e.g. un milled maize) and sell it with minimal added value. Farmers lack simple processing equipment (e.g. rice miller) or direct access to milling facilities (e.g. transportation). Another problem is the absence of postharvest handling equipment to improve the quality of the product (e.g. tarpaulins for drying the harvest). And finally, farmers lack knowledge on postharvest handling and value addition (Bangizi, 2015)

Processing capacities is still limited as pointed out by all the staff interviewed for cooperative societies in the region. The area of value addition is still virgin which farmers can exploit with support from EADEN because of the high costs of processing equipment. This is the biggest opportunity that now Maize farmers have of value addition to remain competitive in the market. Otherwise selling raw maize and dried grains at household level will not help farmers anymore to improve on their income potential (Bangizi, 2015).

Throughout countries of Eastern and Southern Africa and elsewhere in Africa, changes are being made to marketing arrangements for food crops, most notably maize. Marketing boards and, in some cases, cooperatives are being abolished, or their crop procurement and handling functions are being radically reduced. Private traders are now expected to buy crops from farmers, transport those crops to the cities and sell them to processors, millers and consumers. In most countries, government-owned mills and agro-processing industries are also being sold to the private sector (FAO, 2010)

FAO (2010) states that changes to the marketing system mean that field-level extension workers will have to develop new skills. In the old days, they did not really have to concern themselves with crop marketing. The marketing board or cooperative received the farmers' maize at warehouses or other buying points and, sooner or later, the farmers were paid. In some cases, the provision of credit was tied in with crop marketing, so that the marketing board deducted credit repayments from the money owing the farmer for his or her maize, and returned them to the bank. Extension workers may have been called upon to advice on the creditworthiness of farmers but rarely had to worry about helping farmers market their crops, as there was only one marketing channel available.

As a result of recent changes, farmers can no longer rely on finding a willing buyer at a marketing board or cooperative depot. Instead, they now have to look for buyers and hence need an understanding of the way the market functions and of prevailing market conditions. When crops are in surplus, farmers cannot even be sure of finding buyers. Under the old system, marketing boards usually bought the maize soon after harvest. Under the new system, traders will only buy to meet their immediate sales requirements. This means that farmers will have to store the maize they plan to sell for much longer than before. Under the old system, there was usually just one buying price which applied to all the country throughout the year. Under the new system, prices vary according to the location and season. Even at the same location, the prices offered by different traders may vary noticeably (FAO, 2010).

 In most countries there were so many problems with marketing by boards and cooperatives that the recent changes to the marketing systems were probably fully justified. But change can be painful and these changes are most painful for farmers. It is, therefore, necessary for extension workers to assist farmers by advising them on what crops to grow, on how and where to sell their

crops and on how to store their crops. They will need to answer farmers' questions about prices, about whether to store their crop or sell immediately and about where to buy, and how to pay for, inputs such as fertilizer and seed (FAO, 2010).

Smallholder farmer organizations enable farmers to have improved access to market for their products at a fairer price (Blandon, Henson, & Islam, 2009). They help members by aggregating the volume of produce over the number of producers, finding a trader interested in buying, negotiating the price and quality specifications, assembling the product for the delivery date and quantity agreed, collecting payment, paying farmers and retaining a small margin for the organization to cover its expenses (World Bank, 2011).

Shiferaw, Obare and Muricho (2006) argued that smallholder farmer groups help the members to lower grading and sorting costs. Sharing information also reduces the cost of searching for market information, which entails transaction costs. Cooperation amongst farmers in negotiating prices with traders increases their bargaining power and empowers them to have greater control over the setting of prices and reduces the time and the cost of marketing. Therefore, farmer organizations can have an impact on poverty through increasing local incomes and money flows in the rural economy, opening networks and opportunities outside the community, increasing rural employment and reducing migration to urban areas (Lyon, 2008).

2.4.1 The role of community smallholder farmer groups on production, processing and marketing of maize.

According to Mukiibi (2001), the yields of maize crops in Uganda can be improved more by farmers growing new high yielding varieties rather than increasing acreage. Improved processing and diversified utilization are required to improve the value of these crops.

Community groups such as smallholder farmer groups provide opportunities for people to participate at grass roots levels. For instance, Salami *et al*. (2010) argue that most community group activities occur in farming systems with the family being important in planning, decision making and implementation of the projects. Such groups also operate within a community level network of relations. To this aspect, Magingxa and Kamara (2003) add that expansion of smallholder farming through their organized groups stimulates faster rate of poverty reduction. In addition, smallholder farmer groups mediate in intra-community conflicts, build infrastructure, attract other development actors (such as donors, NGOs) into the community and therefore help many individuals to work more effectively and collectively (Okello & Swinton, 2007).

Through community groups, efforts of the people are combined with those of development actors (such as NGOs) to improve socio-economic and cultural conditions of the communities (Ouma *et al*., 2010). They further argued that community farmer groups provide an avenue for people to organize themselves for planning action, define their common individual needs, problems and offer solutions thus facilitating rural development.

In Uganda, farmer groups are targeted as an important means of increasing uptake of agricultural technologies to enhance agricultural productivity, commercialization and linking farmers to markets (Lwanga-Ntale &Kimberly, 2003). Although the approach has attracted attention, little is known on how successful the approach is in addressing the country's agricultural transformation. Ugandan government considers transformation of agriculture as a major driver in changing the country from a peasant to a modern and prosperous economy (Government of Uganda, 2010).

Ouma *et al* (2011) noted that the rapid growth of smallholder farmer groups have led to development agencies and other stakeholders in the region to engage in promoting improved technologies and innovations to help improve farm productivity and household income of the resource-poor smallholder farmers. However, the complexity of knowledge and information processes on the promotion and adoption of improved technologies and innovations calls for development partners to seek for valuable knowledge beyond individual partner's own institutional boundaries (Ali & Kumar, 2011).

2.5 Factors that enable smallholder farmer groups to improve the production, processing and marketing of maize

The formation of smallholder farmer groups is the first joint efforts by people (group members) towards self and rural development (Abegunde, 2009). This is in support of free market approaches to economic development which calls for more local decision making and more locally based economic ventures. At the Centre of this approach is a strong community commitment to offer resources and information, overcome collective problems and improve the functioning of local labour markets. Abegunde (2009) reports that rural agricultural development involves the initiators, supporters and beneficiaries of any defined development effort. The empirical findings from foregoing previous studies show that a farmer group should concentrate on developing programs that transform communities through supporting self-reliance and underlining popular participation in their development activities to impact positively on rural development (Lwanga*, et al.,* 2003).

Market access proponents make a strong and attractive case that for smallholder farmers to thrive in the global economy, it is necessary to create an entrepreneurial culture in rural communities

where "farmers produce for markets rather than trying to market what they produce" (Lundy, *et al.*, 2002). From an implementation perspective, this means shifting the focus from production-related programs to more market-oriented interventions. This has placed renewed attention on institutions of collective action most often realized through the structure of farmer groups as an important and efficient mechanism for enhancing the marketing performance of smallholder farmers (Kariuki & Place, 2005).

Kherallah and Kirsten (2002) argue that overcoming the problem of high transaction costs requires that smallholder farmer groups rely on external rather than internal economies of scale through collective action. Blandon *et al.,* (2009) suggests participatory, farmer led producer organizations that handle output marketing, usually after some form of bulking to address the problem of market access. Rural farmer organizations are the various forms of organizations that perform production and marketing for members (Stockbridge *et al*, 2003).

2.5.1 Improving marketing of maize by smallholder farmer groups in Hoima District

Barrett (2008) in review of market participation studies concluded that farmers' limited resource endowments and the unavailability of more productive technologies suitable for varied agro-ecological conditions constrain production and hence ability to produce a marketable surplus. This suggests that the market can exist and the challenge is the amount to supply to that market.

Factors associated with transport and transaction costs are sometimes statistically significant but typically explain a very small part of the variation in market participation (Mather & Jinks, 2013). Therefore this affects the access of markets by the farmers which in turn affects the level of productivity at their farms.

Jayne, Mason, Burke, Shipekesa, Chapoto &Kabaghe (2011) established that there is a high degree of correlation between the distance traveled to the point of maize sale and the distance to the nearest place where vehicular transport can be accessed in Zambia. Therefore, proximity to feeder roads is an important determinant of traders' willingness and ability to enter into remote areas to provide markets for smallholder farmers' surplus production.

According to IFAD (2003), severities such as low population densities in rural areas, remote location and high transport costs present real physical difficulties in accessing markets. This leaves the rural poor constrained by their lack of understanding of the markets, their limited business and negotiating skills, and their lack of an organization that could give them the bargaining power they require to interact on equal terms with other, larger and stronger market intermediaries. Furthermore, rural producers from developing countries face significant impediments in accessing rich countries' markets (IFAD, 2003).

In Malawi, Jayne, *et al.,* (2011) found out that apart from factor endowment and exposure to agro- ecological risks, differences in the household's access to commodity markets significantly influence its cropping shares and farm income, thus in turn affects productivity.

Maziku (2015) in estimating the effects of transaction costs on market participation and sales of maize in the major maize producing districts (Mbozi and Sumbawanga) of Mbeya and Rukwa regions, located in the Southern Highland of Tanzania. This implies that smallholder farmers' market participation will increase with the reduction in the distance to the market.

Markets are often seen as one of the main determinants of agricultural productivity. Recently, evidence suggests that the intensification of farming systems over much of Sub-Saharan African countries has been more limited and less beneficial to farmers in comparison to

tropical areas of Asia and Latin America, and several researchers point to poor access to markets or inefficient markets as root causes (Joshi, Prichard, & Heady, 2013; Binswanger & Savastano, 2014).

In northwestern Ethiopia, Minten, Murshid & Reardon (2013) found out that transaction and transportation costs increased fertilizer prices at the input distribution center between 20 and 50 percent which reduced crop productivity. Similarly, Zerfu & Larson (2010) showed that the other challenge is the transportation time by farmers in rural Ethiopia to reach the markets.

In addition, the distance from market affects the price and availability of improved seeds in most parts of Africa which in turn negatively affects agricultural productivity (Shiferaw, Kebede & You 2008; Yorobe & Smale 2012; Joshi, et al., 2013).

In particular, access to markets is hindered by both observable and unobservable costs in agriculture. Observable (tangible) costs are associated with transport, handling, packaging, storage costs whereas unobservable (intangible) costs include information asymmetries, search costs, bargaining costs and the costs of enforcing contracts (Birthal et al. 2005; Jensen et al, 2009). All these costs limit agricultural productivity.

According to Dorward *et al*. (2006) and Poulton *et al*. (2006), the major proponents of market-led growth contend that enhancing market access for smallholders will lead to increased incomes and food security, more opportunities for rural employment, and sustained agricultural growth. In contrast, Omaru and Farrington (2004) argue that such a model may lead to the opposite effect, with increased food insecurity due to market dependence and volatile prices, as well as bring about other negative impacts, such as increased environmental degradation from intensive farming practices and reduced biodiversity.

In Uganda, the Government identified cooperatives, a group promoting setup as one of the central pivots to reduce poverty, unemployment and high levels of inequality and to accelerate farmer empowerment and development for the benefit of previously disadvantaged majority (Jjuuko, 2008). Agriculture, including farming, forestry, fisheries and livestock is the main source of employment and income in rural areas where the majority of the world's poor and hungry people live. Agriculture cooperatives have been found to play a crucial role in enhancing productivity of smallholder farmers (Okello, 2005). Being voluntary, democratic and self-controlled business associations, co-operatives offer the institutional framework through which local communities gain control over productive activities from which they derive their livelihoods. The co-operative sector contributes to food production and distribution, and in supporting long term food security. The sector offers prospects that smallholder farmers would not be able to achieve individually such as helping them to secure land rights and better market opportunities. Smallholder farmer groups can gain big benefits from agricultural co-operatives including bargaining power and resource sharing that lead to food security and poverty reduction for the millions (Adejobi & Kassali, 2013).

2.6 Challenges Faced by Smallholder Farmer Groups

This section looked at the challenges that are faced by smallholder farmer groups in their pursuit of production, processing and marketing their maize.

2.6.1 Maize production

Maize is hugely important to the people of Hoima District of Uganda, both as food and as a cash crop. On average, local farmers were planting two acres of maize each, from which they typically harvested around 1,000 kg. Lack of good practices and ethics of managing group enterprises by the group leaders, often carrying out their functions with little or no respect for

accountability and transparency principles, misuse of authority and group finances by the leaders, inducing mistrust, were alleged to be some of the main reasons for ineffectiveness/failure of some groups in Kenya (Okoko *et al*., 2008).

According to Abaru, Nyakuni and Shone (2006) agricultural production and access to food in many Sub Saharan regions may be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and the yield potential of some mainly arid areas are expected to decrease. Episodes of heavy rainfall and drought are likely to become more frequent and severe. Under such circumstances, the prospects of achieving the set goals of smallholder farmers may be seriously compromised.

According to Bembridge (2000) smallholder farmer groups in developing countries face various challenges that impede their growth and ability to effectively contribute to food security relative to the commercial farmers. Some of the constraints they face relate to lack of access to land, poor physical and institutional infrastructure. Most smallholder farmers are in rural areas and mostly in the former homelands where lack of both physical and institutional infrastructure limits their expansions. Lack of access to proper roads, for example, limits the ability of a farmer to transport inputs, produce and access information. Infrastructure is very poor, markets for agricultural inputs and outputs are often missing and unreliable for smallholder farmers. This means that the acquisition of agricultural resources becomes different and the supply of market services also becomes limited. Lack of assets, information and access to services hinders smallholder participation in potentially lucrative markets.

High transaction cost is also one of the major factors constraining growth of smallholder farmers and this is largely attributed to poor infrastructure (Ali & Kumar, 2011). A poor road network,

for example, and unreliable distribution of rainfall will force farmers to grow their own food and less of perishable commodities causing a lower productivity. Increased cost of transport will also affect inputs used and the market strategies followed by the farmers. In most cases high transaction costs are caused by, among others, poor infrastructure and communication services in remote rural areas. It can also result from information inefficiencies and institutional problems such as the absence of formal markets (Masaba, 2014). Additionally, Lack of human capital has also been found to be a serious constraint for smallholder farmers. They are often illiterate with poor technological skills, which can be serious obstacles in accessing useful formal institutions that disseminate technological knowledge. The majorities of smallholder farmers lack financial and marketing skills and are unable to meet the quality standards set by fresh produce markets and food processors. Lack of production and processing knowledge leads to lower quality in production (Trauger, Dorward & Kydd**,** 2009).

Case studies were picked from other ecological settings other than Hoima District, hence leaving a gap that was filled by this study. The case studies were very critical in directing the course of the study as they guided the researcher on the specific issues bedeviling maize farmers elsewhere. According to Mukiibi (2001), the yields of maize crops in Uganda can be improved more by farmers growing new high yielding varieties rather than increasing acreage. Improved processing and diversified utilization are required to improve the value of these crops.

The findings from the reviewed studies above were thus crucial in providing a direction to the researcher on which key issues to investigate about.

2.6.2 Maize Processing

Maize is a significant food source for much of the world's population and represents a vehicle for vitamin and mineral deficiency intervention. There are several industrial processes that generate a wide variety of maize products to fulfill consumers' habits and preferences. Many products of the industrial dry maize–milling processes may also be produced locally on a small scale as well as in the home. The materials, processes, and equipment are readily available, but it is important to consider that the number of nutrients removed or altered through home or small-scale industry processing may vary widely. Proper assessment of population needs and understanding of industrial capability, products, and losses are needed to determine the viability of maize product fortification (Eckhoff, 2010).

The Biggest processing actors for maize are mill owners who are in the towns in the area with the majority in Mbale, Jinja, Tororo and Iganga towns. Other players in the processing are manufacturers of bags who provide sacks for bagging, transporters and finance institutions who give soft loans to the processing companies. Farmers in most cases market their crops without processing it (e.g. un milled maize) and sell it with minimal added value. Farmers lack simple processing equipment (e.g. rice miller) or direct access to milling facilities (e.g. transportation). Another problem is the absence of postharvest handling equipment to improve the quality of the product (e.g. tarpaulins for drying the harvest). And finally, farmers lack knowledge on postharvest handling and value addition (Bangizi, 2015)

Processing capacities is still limited as pointed out by all the staff interviewed for cooperative societies in the region. The area of value addition is still virgin which farmers can exploit with support from EADEN because of the high costs of processing equipment. This is the biggest opportunity that now Maize farmers have of value addition to remain competitive in the market.

Otherwise selling raw maize and dried grains at household level will not help farmers anymore to improve on their income potential (Bangizi, 2015). According to Mukiibi (2001), the yields of maize crops in Uganda can be improved more by farmers growing new high yielding varieties rather than increasing acreage. Improved processing and diversified utilization are required to improve the value of these crops.

2.6.3 Marketing of maize produce

Shiferaw *et al*., (2009) noted that inconsistency in production coupled with lack of bargaining power is also a major challenge faced by smallholder farmers. On the one hand, most smallholder farmers are not consistent in terms of producing products and supplying them to fresh produce markets and agro-processing industries. On the other hand, their bargaining power is very low owing to poor access to market information and limited access to financial markets, which prevent them from selling their products at the most profitable time. Shiferaw *et al.* (2009) adds that smallholder agricultural growth will not be achieved without access to support services. Increasing agricultural productivity requires addressing all problems simultaneously. Cooperative development has been found to be one of the most effective interventions through which growth in smallholder farming could be enhanced thereby creating long term food security, job opportunities and income.

Uganda agriculture is dominated by smallholder farmers in rural areas and therefore the sector faces several challenges including limited market and market access, poor infrastructure, high costs and limited access to improved inputs, output market and production technologies. There is also lack of agricultural credit facilities and inadequate manpower especially extension services (Okori, 2011). Other challenges that inhibit progress include unreliable data due to lack of quality research, lack of processing knowledge, poor coordination of producers, global price

increases and lack of ownership and control of land especially for women (who are the majority participants in the sector).

2.7 Summary of Literature Reviewed

In brief, the literature has shown that there are smallholder farmer groups in maize production. When smallholder farmer groups are availed with the necessary support from stakeholders, they tend to improve their farming techniques and methods which in a long run promote agricultural production, processing and marketing of maize. According to Uganda Census of Agriculture by UBOS (2008/2009) stated that the estimated number of plots under maize was 2.9 million. Out of these, 1.4 million (47.1%) were of pure stand while 1.5 million (52.9%) were of mixed stand. The regional figures indicate that, the Northern Region with 63.1 percent had the highest percentage of its maize plots in pure stand followed by the Western Region (47.3%) while the Eastern Region had the least (40.7%). The national MPS was estimated to be 0.35 Ha. The Northern Region had the highest estimated MPS of 0.39 Ha followed by the Central Region with 0.37 Ha while the Eastern Region had the least (0.32 Ha). The estimated MPSs for UNHS 1995/96, UNHS 1999/00 and UNHS 2005/06 were 0.20, 0.28 and 0.18 Ha respectively.

Processing capacities is still limited as pointed out by all the staff interviewed for cooperative societies in the region. The area of value addition is still virgin which farmers can exploit with support from EADEN because of the high costs of processing equipment. This is the biggest opportunity that now Maize farmers have of value addition to remain competitive in the market. Otherwise selling raw maize and dried grains at household level will not help farmers anymore to improve on their income potential (Bangizi, 2015). According to Mukiibi (2001), the yields of maize crops in Uganda can be improved more by farmers growing new high yielding

varieties rather than increasing acreage. Improved processing and diversified utilization are required to improve the value of these crops.

Throughout countries of Eastern and Southern Africa and elsewhere in Africa, changes are being made to marketing arrangements for food crops, most notably maize. Marketing boards and, in some cases, cooperatives are being abolished, or their crop procurement and handling functions are being radically reduced. Private traders are now expected to buy crops from farmers, transport those crops to the cities and sell them to processors, millers and consumers. In most countries, government-owned mills and agro-processing industries are also being sold to the private sector (FAO, 2010).

In addition, literature showed that irrespective of the challenges they face, there is a positive significant contribution of smallholder farmer groups to agriculture development. While Shiferaw *et al* (2009) and Okori (2011) highlighted the challenges of marketing grains in Uganda, maize inclusive; their case studies were not concentrated on groups and, further, were not carried out in Hoima District. This left gaps that were filled by this study. Therefore, different authors have expressed their views in general about the general performance of smallholder farmer groups. Nevertheless, most of these studies have been done in western Africa and other African countries, more so they were done in different organizations. In Uganda, none of them has been done in Hoima District. This study therefore sought to fill this research gap.

CHAPTER THREE

METHODOLOGY

3.1   Introduction

This chapter gives a description of procedures that were undertaken in the study. It comprises the research design, area of study, study population, sample size and selection strategies. It also presents the procedure used in data collection and data analysis.

3.2 Research Design

A research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions and problems (Kumar, 2005). It was the overall scheme of the research and included an outline of what the investigator did right from writing hypotheses and their operational implications to analyzing of the data collected. The study adopted a cross sectional survey design which according to Mugenda and Mugenda (2003) collects data at the same time easily and avoids contamination. Data were collected using questionnaires and interview guides. Both closed and open-ended questionnaires were used to generate data. The cross sectional survey design facilitated the statistical description of variables and testing of relationships among them as well as the narrative interpretation of qualitative findings hence aiding deeper understanding relationship between belongingness to farmer groups and maize production.

3.3   Area of Study

The study was carried out in Hoima District with four county constituencies. Hoima District has a population of 287,906 males and 285,080 females and the major economic activity is farming

with 86.29% of the total households engaged in farming, both crop and livestock. The highest proportions of the households grow maize at a rate of 57.2% of the total households in the Bunyoro sub region (UBOS, 2017). Hoima District has Smallholder farmer groups as grass root farmer institutions organized for a common farming interest. The district has built a strong local and national organizations and a network that can help in fostering agricultural development (Trauger, *et al*., 2009).

The study examined the role of smallholder farmer groups in production, processing and marketing of maize in Hoima District.

3.4 Study Population

A population is a set of persons or objects that possess at least one common characteristic (Bailey, 1994). The study population consisted of smallholder farmers in production, processing and marketing of maize from the selected farmer groups of Kibaire, Bugambe, Kigorobya, Bugahya and Buhaguzi sub counties. The farmer groups sampled were representative of the entire smallholder farmer groups in Hoima District. The study population was 220 farmers, the unit of study was maize farmers and the unit of analysis was famer groups. This population enabled the researcher to gather enough information concerning the study objectives.

3.5 Sample Size and Sampling Techniques

A sample is a subset of some pre-determined size from a population of interest (Gott & Duggan, 2003) which when studied, the sample results may be fairly generalized back to the population from which they were chosen (Trochim, 2002). To get a reasonable representative sample suitable to give reliable results, Krejcie and Morgan (1970) table was used to determine the

sample size from the target population (see appendix D). This means that, basing on the selected population of two hundred and twenty (220) farmers in all the groups, a sample size to be chosen were one hundred and forty (140) respondents. However, to ensure that all the one hundred and forty (140) individuals that comprised the study populations have an equal chance of being included in the sample, simple random sampling technique was used to select the subscribed respondents in Hoima District. Krejcie and Morgan (1970) Table was used in selecting the sample from the population. The Table has a sample size that ought to be selected from a given population size against it (see Appendix D)

Table 3.1: Study Population, Sample Size and sampling Techniques

Category/ Group	Study population	Sample Size	Sampling Techniques
Kibaire farmers group	42	31	Simple random
Bugambe farmers group	40	30	Simple random
Kigorobya farmers group	43	21	Simple random
Bugahya farmers group	50	38	Simple random
Buhaguzi farmer group	45	20	Simple random
Total	**220**	**140**	
Hoima district			

3.5.1 Sampling Techniques

The study employed simple random sampling technique. Simple random sampling was used to select all smallholder farmers who were the target group of respondents. According to Patton (2002), simple random sampling permits confident generalization from a sample to a larger population, avoids bias, easy to use and permits them to provide relevant information in the process such that each farmer of 220 farmers had an equal chance of being selected .A paradigm

for constructing a simple random sample consisted of enumerating all farmers in the production,processing and marketing maize was chosen(140 respondents) as a subset of element using arandom digit table.

3.6 Data Collection Tools

Data collection methods are several interrelated activities aimed at gathering information to answer the research questions (Creswell, 2009). The study used a cross sectional survey design for data collection through interviews and questionnaires.

3.6.1 Questionnaires

The researcher used a self-administered questionnaire as an instrument to collect data from the smallholder farmer groups who were able to read and write. Questionnaires were distributed to individual farmer groups to fill. They gave responses on the production, processing and marketing of maize. Since respondents were always busy at work, self-administered questionnaires were very effective because respondents would participate in the study at their convenient time. The questionnaires comprised close and open-ended items which according to Patton (2002) yield in-depth responses about people's experiences, perceptions, opinions, feelings, and knowledge. They also helped in collecting much data which in turn helped the assortment of vague and 'off track' information (Amin, 2005).

3.6.2 Interview Guide

According to Bailey (1994), an interview is an instance of social interaction between two individuals, the interviewer and the respondent. The interviewer used an interview guide as the instrument which allowed for an in-depth examination of the key informant on issues related to

maize production, processing and improvement of marketing. Interviews enabled the interviewer to establish good rapport with the respondents, allowing the interviewer to observe, discuss and listen as well as permitting complex questions to be asked. Respondents gave their views on the challenges they went through maize production, processing and marketing and the benefits of having smallholder farmer groups.

3.6.3 Observation guide

This tool was applied to assess the quantity and quality of maize produced and processed by different smallholder farmer groups in terms of hectares and metric tonnes respectively. It was also used to observe group characteristics and activities used in production and processing.

3.6.4 Focus Group Discussion Guide

It was necessary to discuss with the different farmer groups in focus groups. A focus group discussion guide was the appropriate instrument for capturing data on production, processing and marketing of maize by the different farmer groups. It also allowed securing information on maize output, food security and income in their groups.

3.7 Validity and Reliability of Instruments

3.7.1 Validity

Validity is concerned with the extent to which an instrument measures what it is supposed to measure (Dessler, 2008). Copies of the questionnaires were reviewed by the research supervisors to ensure that the instrument measured what it was supposed to measure, in addition to checking on the phrasing, understandability and wording of the statements. Furthermore, a content validity index (C.V.I) was computed to establish the extent to which the questionnaire measured what is

was supposed to measure. The content validity index (C.V.I) was found by considering the number of items declared relevant divided by the total number of items that were presented. According to Amin (2005) an instrument to be acceptable as valid, the average index should be 0.7 or above. Any CVI computed that is above 0.7 means the construct is valid. According to Odiya (2009), the CVI computed should be above 0.6. In this study, the 0.6 value as per Odiya (2009) was used in judging the validity or otherwise of the questionnaire.

The following results were obtained;

Table 3.2: Content Validity Index of the study variables

Variable	Total Number of items	Number of items judged relevant	CVI
Group factors	12	9	0.75
Contributions to Production	15	12	0.80
Challenges	20	17	0.85
Maize Production	17	14	0.82
Food security	12	10	0.83

Source: From expert judgment

The computed CVIs were above the 0.60 threshold with an average of 0.81 postulated by Odiya (2009) and 0.70 by Amin (2005) implying that the tool that was used in collection of the data contained valid questions.

3.7.2 Reliability

Reliability refers to the extent to which one believes that instruments are dependable, consistent, stable, trustworthy and therefore reliable (Patton, 2002). That is, the degree to which measure yields consistent results (Adler & Clark, 2003). This occurs when a test measures the same thing more than once (Salkind, 2012). Reliability measured the degree to which the questionnaire could produce consistent results under same conditions. The questionnaires were pilot tested on respondents from a non-sampled area and the results were subjected to Cronbach's alpha reliability (Cresswell, 2014; Odiya, 2009), which is a test of internal consistency, whose alpha coefficient should be 0.7 or above. The computed Cronbach Alpha values were as follows

The results obtained are as shown in Table 3.3;

Table 3.3: Reliability Analysis

Variable	Number of items	Cronbach alpha coefficient
Group factors	9	0.84
Contributions to Production	12	0.82
Challenges	17	0.81
Maize Production	14	0.85
Food security	10	0.74

Sources: From primary data reliability test in SPSS

Table 3.3 above shows the alpha value for each of the study variables with an average of 0.82 was higher than 0.60 recommended for social research by Odiya (2009) and 0.7 as recommended by Amin (2005) suggesting that all the items used to measure each variable were consistent and

would produce similar or close to exact results of this study when administered in a related study setting.

3.8 Research Procedure

Trochim (2005) defined research procedure as the brief description of the overall sequence of steps to be followed during the study. Any procedures followed to assure that participants are protected and informed of how their confidentiality is protected. The researcher obtained an introductory letter from Kyambogo University and clearance from Uganda National Council of Science and Technology (see appendices G and H respectively) to permit her conduct the study. The letters were presented to the Hoima District Council for authorization and acceptance to undertake the research in the District. After getting the authorization, then the researcher piloted the instruments (questionaries, interview guide and observation guide) with the help of 3 trained research assistants and 32 individual maize farmers, who belonged to different farmer groups, were used. The piloting was done to check the effectiveness of the tool for data collection. The pretesting of the tools was accomplished in 4 weeks and the tools were found to be effective collecting reliable data. Thereafter, the tools were updated, and the research team then proceeded to the farmer groups to collect data, which took close to five months.

3.9 Data Quality Control

This refers to the measures the study institutes to eliminate bias, ensure accuracy and collection of relevant data (Amin, 2005). Data quality control lays emphasis on avoiding mistakes during research and ensuring quality of data. The researcher with the help of the supervisors checked, verified questions and other collected information to ensure completeness and accuracy. This involved constant editing of data and results to ensure a minimal error rate.

3.10 Data Analysis and Presentation

According to Fisher, *et al*. (2010) data analysis deals with sorting and shifting of the data collected to make sense out of it. It is a process of bringing order into data collected in ways which enabled the researcher to make sense of the data to help answer the research questions and to meet the objectives of the study.

3.10.1 Qualitative Data Analysis

Content analysis was used to analyze qualitative data. Data were organized basing on the patterns and commonalities and were arranged into themes based on the study variables. The responses were summarized using statistical processors and presented in lists. An ordinal scale was used to measure the qualitative data because according to Zikmund (2003) it ensures effective arrangement of the categorized responses in order of importance.

3.10.2 Quantitative Data Analysis

Quantitative data were coded and analyzed using Statistical Packages for Social Sciences (SPSS), (Doug, 2017). This method was preferred because it is modern, faster and a simpler tool for analysis of data. Measures of central tendency were used to determine the minimum and maximum scores, means, and standard deviation. Data were organized, analyzed and reported. The relationships between and among variables were analyzed as shown in Table 2. This enabled the researcher to make comparisons and draw conclusions in relation to the findings.

Table 3.4: Summary of Data Analysis

Research objective	Questions/hypothesis	Independent Variable	Dependent Variable	Relationship	Data analysis tool
To identify the challenges faced by smallholder farmer groups in a bid to uplift food security and incomes	**QUESTIONS** What are challenges faced by smallholder farmer groups in a bid to uplift maize out, food security and incomes? What are the factors that enable the smallholder farmer groups to improve the production, processing and marketing of maize? Does membership to a farmer group increase productivity of maize?	-Group knowledge on maize production -Group skills on maize production -Education for development	**Production** -Output (kg/ha/person, kg/hectare/group) **Processing** -kg of flour/animal feeds **Marketing** -sales kgs/person/group -income/person/group **Food security** -Access to food/person, -Availability of food/,value of person food production and utilization)	Explanations of the effects of challenges on production ,processing, Marketing and food security	-Descriptive analysis, -Content Analysis, -Thematic Analysis. -Ordinal scale
To find out the role of smallholder farmer groups in production, processing and marketing of maize.	**HYPOTHESES** Smallholder farmer groups have no significant role in maize production and processing	-Group size -Active members in the group -Group savings -Purchasing ability	Income (per hectare/person, per hectare/group)	Correlation	Pearson coefficient
To identify the factors that enable smallholder farmer groups to improve the market situation of maize produce	Smallholder farmer groups have no significant role in the marketing of maize produce	-Labour, Land -Managerial level -Cohesiveness -Information sharing collective decision making		Association	Chi-square

3.11 Ethical Considerations

According to Hart (2005), ethics are concerned with the attempt to formulate codes and principles of moral behavior. The study was guided by the ethical consideration that confined to confidentiality of the respondents to participate in the study. The researcher first presented an introductory letter and an identity card to the target population requesting for maximum participation and cooperation as the study was purposely academic. Later, the researcher assured them that the information produced was only to be kept for academic purposes and their identity would not be disclosed.

CHAPTER FOUR:

PRESENTATION OF THE RESULTS

4.1 Introduction

In this chapter, the findings of the study are presented and interpreted in the gist of the specific

objectives the study set out to achieve. The findings are presented under themes developed from

the specific objectives. The presentation of the quantitative findings is supported by the

qualitative results obtained from the Focus Group Discussions and the observation guide (FGDs)

held with selected respondents. The findings are further discussed in line with the literature

reviewed in Chapter Two.

4.2 Background Characteristics of the Respondents

The study sought for the background characteristics of the respondents. These included age,

education, sex and family size among others. The results obtained are shown in Table 4.1

Table 4. 1: Characteristics of Respondents (n=140)

Characteristics	Percentage
Sex	
Male	64
Female	36
Age	
20-30	19
31-40	29
41-50	24
51-60	10
>61	18
Educational level	
No formal education	26
Primary	58
Secondary	14
Post-secondary	2
Religion	
Catholic	59
Protestant	29
Pentecostal	10
Muslim	2

Source: Primary Data, June 2017

Table 4.1 shows that majority of the respondents (64%) were males and 36% were females. This implies that there was a domination of male respondents in this study. The mean age of the respondents was 45 years and the age ranged between 20 and 92 years. Most of the respondents were married (79%), 58 % of the respondents had completed primary education while Catholics comprised majority of the respondents (59%). The mean household size was found to be 6 members. Compared with the national average household size of 4 members (Hoima District Development Plan, 2011-2015), this meant that a typical household in Hoima District has a big size. The majority of the respondents were engaged in crop farming (85%) mainly producing maize, beans, ground nuts, cassava and Irish potatoes in that order of importance. The average monthly income earned by majority of the respondents was UGX 156,000 while on average; a household spent UGX 125,000 (Hoima District Development Plan, 2011-2015). This implied that an average household relied on subsistence production since the amount of expenditure by a household was almost close to the income earned.

4.3 Role of smallholder farmer groups on maize production

4.3.1 The role of Farmer Groups

In this specific section, data were sought on the role of the farmers groups in production, processing and marketing of maize in Hoima District. Nine (9) questions were set soliciting for the opinion of the respondents on how their membership in a farmer's group had impacted on the productivity of maize, processing as well as its marketing. The following results were obtained;

Table 4. 2: Opinion of the respondents on the role of Farmers' groups towards improved maize production.

Measures of the role	N	A	D	UD	Mean	Std. Dev
1. Ensuring collective decision making on market ventures	140	132(94.3%)	4(2.9%)	4(2.9%)	4.4857	.75375
2. Ensuring high quality produce through value addition or proper grading	140	96(68.5%)	32(22.9%)	12(8.6%)	3.8143	1.14166
3. Focusing from productive-related programs to market-oriented interventions	140	132(94.3%)	0(0.0%)	8(5.7%)	4.3714	.60386
4. Make through research about the price levels elsewhere	140	132(94.3%)	4(2.9%)	4(2.9%)	4.5000	.87737
5. Forming market committee with the farmer groups	140	113(80.7%)	27(19.3%)	0(0.0%)	4.6643	.78301
6. Improving bargaining power through agricultural cooperatives	140	128(91.4%)	4(2.9%)	8(5.7%)	4.2071	.66242
7. Promoting resource sharing	136	113(83.1%)	19(14.0%)	4(2.9%)	3.9124	1.15348
8. Considering consumer tastes, expectations and preferences	140	100(71.5%)	20(14.3%)	20(14.3%)	4.2786	.72039
9. Apply good farming techniques	140	110(85.7%)	16(11.5%)	4(2.9%)	4.3500	.98860

A=Agreed, D=Disagreed, UD=Undecided (No Opinion)

The rating scale was Likert scale which stood as follows for interpreting Mean: 1-2.49=Disagreed, 2.5-3.49= Undecided, 3.5-5.00=Agreed

Ensuring collective decision making on market ventures in Table 4.2 shows that majority of the respondents, 132(94.3%) agreed that their membership in a farmers group had boosted their

capacity to produce more maize compared to a time before when they produced maize on their own because group membership ensures collective decision making more so on market ventures. This is further proved by the mean value (Mean=4.48, St. Dev=0.75) implying that the group dynamics greatly improved the capacity of the farmers to produce more maize as they were assured of market. Equally, majority of the respondents agreed that their group ensured quality produce through value addition and or grading.

Ensuring high quality produce through value addition or proper grading shows that majority of the respondents, 96(68.5%) agreed that they had benefitted from group membership as quality through value addition and grading are emphasized. As further confirmed by the mean value (Mean=3.81, St. Dev=1.41), group membership enabled the maize farmers to sell their produce at high price (UGX, 1200) for a kilogram of sorted and graded maize instead of UGX 800 for ordinary. The value addition however was not commonly practiced and therefore, its benefits were not spread across the seasons. The respondents through informal conversations confirmed that the major constraint to maize marketing in their area was the boom- and burst- price fluctuations resulting from glut during harvest and scarcity at off-seasons. This glut usually results from the lack of storage, processing and preservation techniques and facilities, which ordinarily should assist farmers in helping to add value to their produce to earn good price and manage price fluctuations. The respondents attested that much has been done into post-harvest handling and storage all of which have brought about an improvement in the productivity of the farmers.

Focusing from produce-related programs to market-oriented interventions from Table 4.1 shows that majority of the respondents, 132(94.3%) agreed that their group had transformed maize production to another level. As further confirmed by the mean (Mean=4.37, St. Dev=0.60),

majority of the respondents thus agreed that their group had focused from productive-related programmes to market oriented programmes. Making through research about the price levels elsewhere shows that majority of the respondent farmers, 132(94.3%) equally agreed that belongingness to a group enabled them to improve on their capacity of maize production. This was largely because their group made thorough research about the price levels everywhere (Mean=4.50, St. Dev=0.87). The respondents through informal conversations revealed that they were furnished with adequate market information which enabled them to make wise choices and decisions. Through interviews with HODFA officials and the District Marketing and Production Officials, it was established the farmers were in most cases tipped to sell a kilogram of maize at more than UGX 800 especially when the markets were secured from World Food Programme of United Nations. HODFA owns standard maize drying machine and so charged each group UGX30 per kilogram to dry their maize to the international standards. The HODFA officials revealed that such maize fetched prices as high as UGX 1,600 when sold to World Food Programme and other international organizations that provide relief to marginalized groups in Uganda such as CRS (Catholic Relief Services) and War Child Holland.

Forming market committee with the farmer groups shows that majority of the respondents, 113 (80.7%) agreed that they had benefitted from forming a market committee within their groups. The key informants in the study appraised the arrangements made by the farmer groups in promoting the formation of market committees among the members. They highlighted that through market committee, competitive and remunerative prices were ensured for the maize produce sold by the farmers through closed tender system in the regulated markets. This is further proved by the mean value (Mean=4.66, St. Dev=0.78) implying that the market committees formed benefitted the farmers. It was established through the FGDs that in 2016 and 2017, the committees managed to bargain with large scale consumers such as prisons,

educational institutions and hospitals, hence negotiating for high price of UGX 950 per kilogram. This increased the profit levels of the groups by a margin of 7%, hence improved livelihoods of the participating farmers. Through informal conversation with the farmers, it was established that most preferred to sell their produce only through regulated markets as compulsory marketing is in force.

Improving bargaining power through agricultural cooperatives shows that majority of the respondents, 128(91.4%) agreed that their belongingness to a farmer's group had greatly improved on their production of maize. As shown by the mean, (Mean=4.20, St. Dev=0.66), the respondents agreed that belonging to a farmers' group improved their bargaining power. From the opinion of the key informants, farmer groups have provided an indelible solution to the weak bargaining position of the individual farmers in the period preceding the formation of the farmers groups.

Promoting resource sharing shows that majority of the respondents, 113(83.1%) agreed that their group had promoted resources sharing among the farmers. The findings as further shown by the mean (Mean=3.91, St. Dev=1.15) indicated that resources hitherto unaffordable to individual farmers such as knapsack sprayers, soil amendments and so forth were now affordable because of consolidated efforts such as pooling of money. The farmers benefitted from the economies of scale and economies of scope. Through informal conversations, it was established that their group had promoted the sharing of ideas and information on the best agronomic practices ought to be followed by the farmers. This encouraged the growth of innovation and further promoted benchmarking among the group members. Benchmarking looks at collecting information about farms that are recognized as 'successful' businesses. With this information comparisons can be made with other farms and useful insights can be gained in understanding how production,

marketing and management practices can be improved. These insights and discoveries can be used to improve farm performance.

Considering consumer tastes, expectations and preferences shows that majority of the respondents, 100(71.5%) agreed that the members of their group were advised by the group leaders on the best varieties of maize such as Longe 5, Longe 6 and Longe 11 as the highest yielding varieties. The respondents also revealed that HODFA in conjunction with the group leaders advised the members on timing of the seasons when the demand for maize and its byproducts would be high (Mean=4.27, St. Dev =0.72) while on applying good farming techniques, majority of the respondents, 110(85.7%) agreed they were taught the procedures of applying good and better farming methods. This was further proved by the mean (Mean=4.35, St. Dev=0.98). The better farming techniques learnt from the groups included postharvest handling technology, spacing, appropriate techniques of applying fertilizers or any other soil amendments, drying and grading techniques, so forth. They attributed the acquisition of better farming methods to the lobbying power of their groups, which consequently led to improved extension services. This led to high quality production, leading to improved sales as shown in the following sections.

4.3.2 Extent of Maize Production

Data were collected from the farmers about the extent of maize production in their group. A comparison was made between the first season and the second season (time for data collection for this study). The following results were obtained;

Table 4. 3: Maize Production and Sales per farmer group

Variety	Qty Planted (Kgs)		Qty Harvested(Kgs)		Qty Sold(Kgs)	
	S 1	S2	S 1	S 2	S1	S2
Longe 5	40	78	1874	2620	1400	2050
Longe 6	27	67	1650	2230	1230	1820
Longe 11	60	102	2014	2940	1540	2210

S1= Season One, S2= Season Two

Table 4.3 shows a progressive increase in the quantity of maize production among the 4 sampled groups by variety of maize. The study findings revealed that on average, a farmer planted maize on 2 acres (0.83 ha) of land that was apportioned to accommodate the three varieties of maize that were commonly grown by the group members. The average selling price per kilogram of maize was UGX 800 across the two seasons. However, through informal conversation with the farmers, the prices were erratic to the extent that sometimes, the price went above the average mark to UGX 1,000 while on some other occasions, it dropped below the average to UGX 550. Figures 4.1 to 4.3 show the proportionate increase in the quantity of maize planted, harvested and sold;
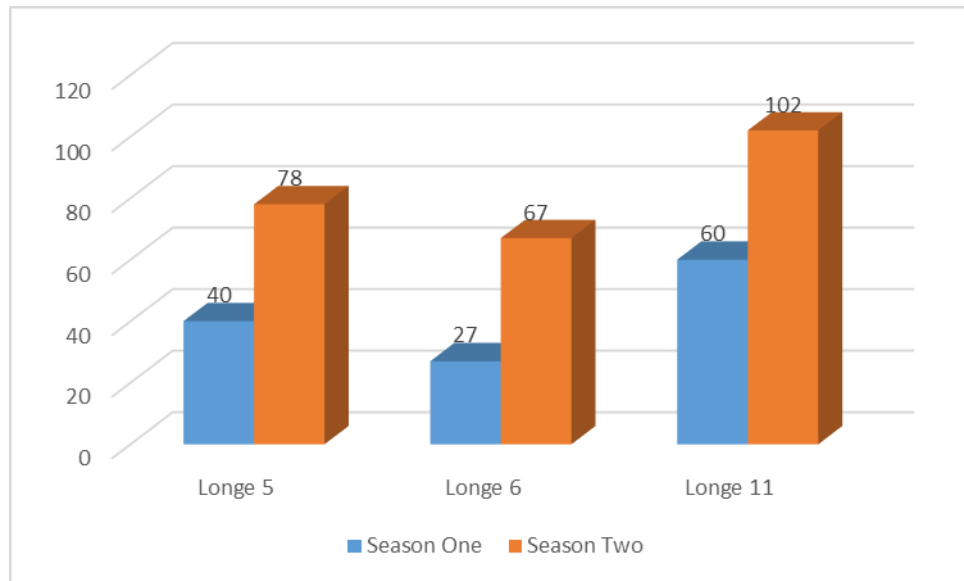
Figure 4. 1: Average Quantities of Maize Seeds Planted per farmer group

Figure 4.1 shows that the most commonly produced maize varieties were Longe 5, Longe 6 and Longe 11. These varieties of maize such as Longe 5 is cheap to purchase and is quick maturing while Longe 6 and 11 are drought resistant, pest and disease resistant and are compliant with different soil types. According to the District Production and Marketing Officials, the three varieties of maize are the most prescribed by NARO and MAAIF because of their vitality and viability. As shown in the Figure 4.1, between the two seasons observed, the quantity of each variety of maize produced has been increased, an indication that maize production has become lucrative due to the improvements brought about by the groups in terms of easy access to fertilizers, farm credit from financial institutions and markets. Through FGDs with the farmers, it was revealed that the group's cohesion has greatly trebled their efforts because of economies of scale. The members during the FGDs unanimously indicated that the groups have facilitated partnerships and development of trust. The trust has led to unity. One of the respondents during FGDs had this to say "Unity is Strength, Combined efforts break the bone".

Through observation, it was established that group members are now able to access a shelling machine at tailor made of pocket friendly prices which has largely reduced on their operational costs. Figure 4.2 shows a model shelling machine that was common among the four groups selected by this study.

Figure 4. 2: A Maize Shelling Machine

The respondents were equally asked to indicate the major sources of the maize seeds grown by the farmers in Hoima District in both seasons One and Two. The following results were obtained;
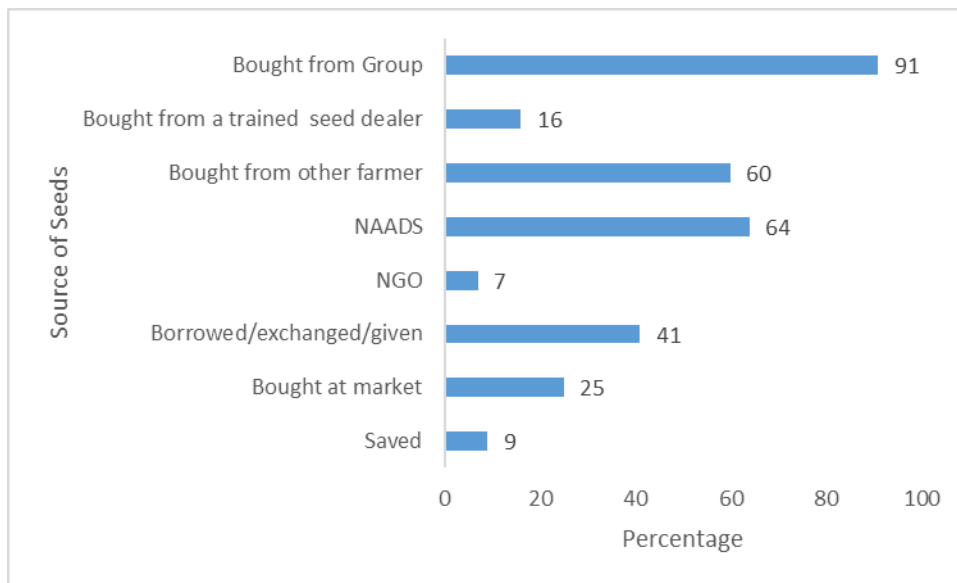
Figure 4. 3: Sources of maize seeds grown by the farmers

Figure 4.3 shows that majority of the farmers accessed maize seeds from their group (91%), followed by buying from NAADS (64%) and buying from fellow farmers (60%). The least used sources were from NGOs, trained seed dealer and use of own saved seeds from the previous

harvest. Through FGDs and the observation guide, it was established that some farmers in the groups were progressive and enlightened more than others. The progressive farmers used modest farming methods that enabled them to produce surplus which they could sell in other seasons as seeds for planting. The failure of some farmers to save seeds for the next planting was largely because the farmers were mindful about their food security which was maize flour for home consumption and therefore preferred to buy than use what they kept in their granary stores at home.

On the quantity of the harvests the respondents gave the following responses. The figures in Figure 4.4 are computed averages from the four groups basing on the data inputted in the last section of the questionnaire.
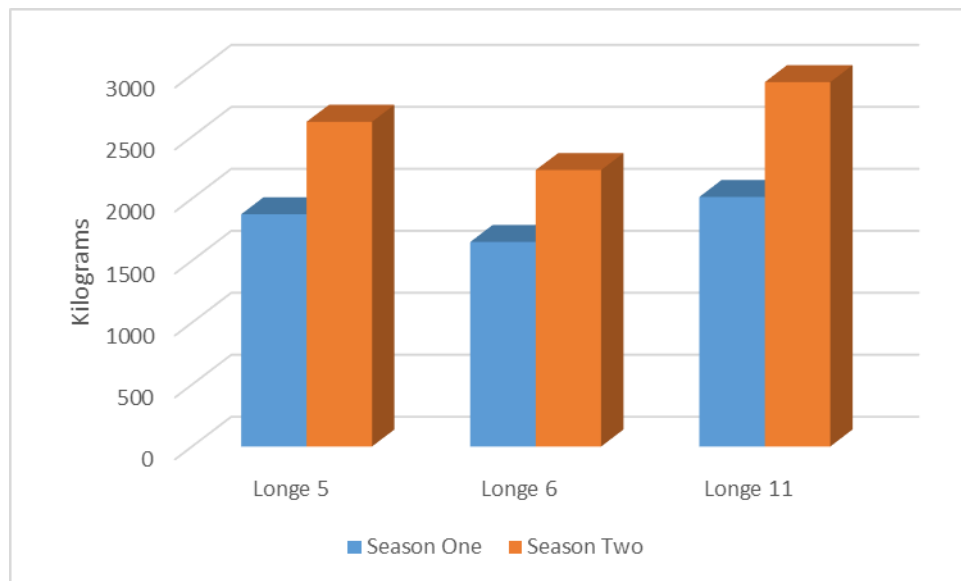
Figure 4. 4: Quantity of maize Harvest by Variety

As can be seen from the Figure 4.4, there was a proportionate increase in the quantity of maize harvested between two seasons. The increase in the quantity of maize harvested was realized in the three varieties that were commonly produced by the groups. However, Longe 11 was

produced more than Longe 5 and Longe 6. This finding therefore portrays a seasonal increase in the production of maize by the individual farmers from each of the four groups.

4.3.3 Levels of Maize Marketing and Consumption

Data on marketing and consumption were obtained from the respondents using questionnaire. The respondents were asked to indicate how they marketed the maize harvested in their group and the modes of consuming the surplus of the maize that was unsold and stored in their homes. The following results were obtained;
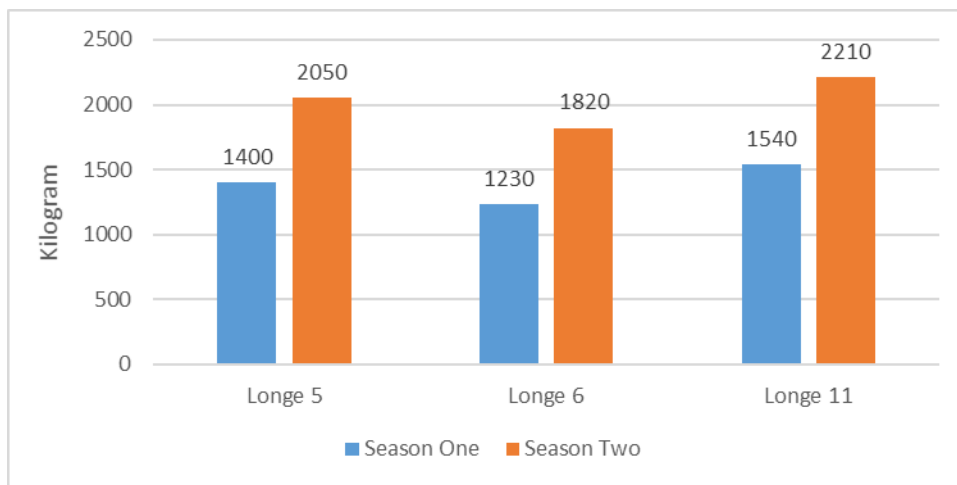
Figure 4. 5: Quantities of Maize Sold

Figure 4.5 shows a progressive increase in the quantities of maize harvested and sold between the two seasons selected for this study. This is an indication there are factors like amount of rainfall 0r temperature variations including group influence the variety difference that affect maize quantities sold. The respondents were further asked to indicate the ways through which they marketed the maize produced. The following results were obtained;
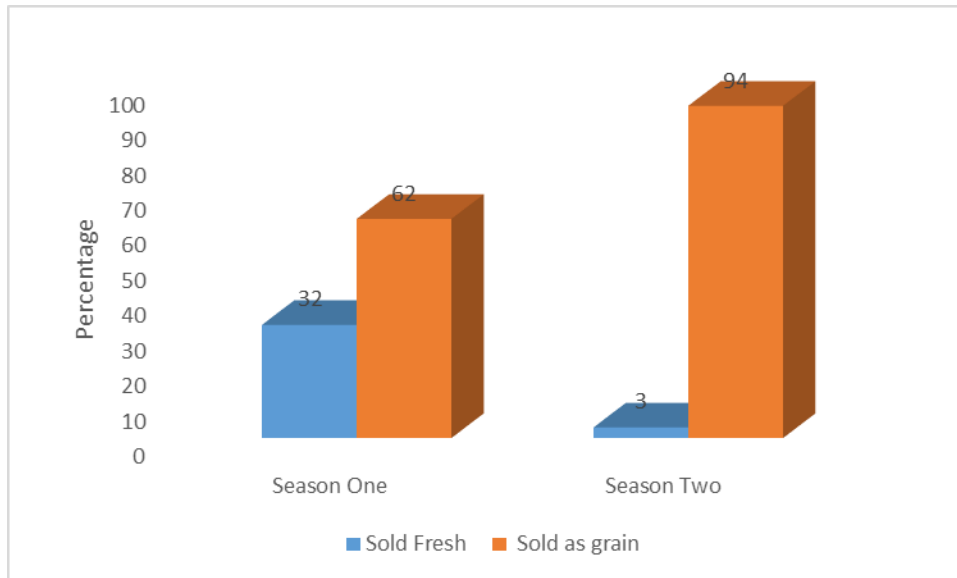
Figure 4. 6: Forms of marketing maize

Figure 4.6 shows that majority of the farmers in both seasons sold the maize as grain or dry seeds. In season One, 62% of the farmers sold main maize grain while a reasonable number, 32% sold it fresh. However, in season two, majority sold it as grain (94%) compared to 3% sold as grain and in fresh form.

As shown Figure 4.6, while most of the maize produced was sold for money, the respondents indicated that some was retained in their stores at home for food. The respondents consumed the maize produced in different ways as shown in the Figure 4.7;
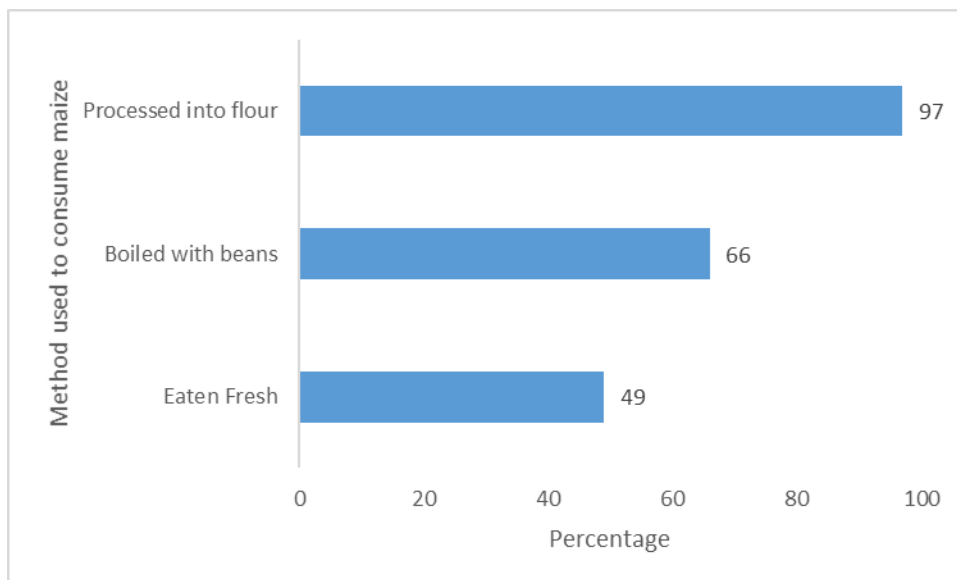
Figure 4. 7: Modes of maize consumption

Note: Multiple responses allowed

Figure 4.7 shows that majority of the respondents (97%) consumed the maize retained from the harvest as flour that was processed from the maize milling machines spread across major small towns of developed villages in the district. As shown by Figure 4.7, a proportionately big number (66%) also boiled it with beans while 49% ate it in fresh form.

4.3.4 Level of Food Security

Having established that some of the maize was reserved by the households for home consumption, the respondents were assessed using a household food security questionnaire to determine the levels of food security of a typical household in the maize producing groups in the area. The following results were obtained;

Table 4. 4: Food security status of Maize farming households

Food security status of household	Frequency	Percent
Food secure	121	86
Food insecure	11	8
Extremely food insecure	8	6
Total	140	100

Table 4.4 shows that 86 % of the households were food secure, approximately 8% food insecure, and only 6% extremely food insecure. The results were that majority of the members in the farmer groups were food secure. This finding therefore implies that belongingness to a farmer group greatly improved the productivity of the individual members giving them the capacity to retain a reasonable proportion of the maize harvest for individual consumption. This has helped to cushion again food shortage and scarcity hence putting the maize farming households in an elevated position to circumvent food insecurity.

4.3.5 Correlation between Group Factors and Maize production capacity

A correlation coefficient was used to establish whether there was a relationship between farmer group factors and maize production capacity. Pearson correlation matrix was used to establish the relationship between the variables. The following results were obtained;

Table 4.5: Relationship between group factors and maize yields

		Farmer Group Factors	**Maize Yields**
Farmer Group Factors	Pearson Correlation	1	.643*
	Sig. (2-tailed)		.012
	N	140	140
Maize Yields	Pearson Correlation	.643*	1
	Sig. (2-tailed)	.012	
	N	140	140

*Correlation is significant at 0.05.

Table 4.5 shows that the correlation coefficient for group factors and maize yields capacity r= .643* p=0.012<0.05. These imply that there was a high positive correlation between farmer group factors and maize yields. Further, the relationship was significant as the p-value, 0.012 which was lower than 0.05. The coefficient of determination of 41.3% implies that group factors such as marketing, large scale buying of seeds and sharing of knowledge explained an increase in the maize yield potential of the households by 41.3%. This is an indication that farmer group dynamics have a greater role to play in the promotion of adoption of better farming technology such as shelling technology, reduced transaction costs because of bulk buying of inputs, collective bargaining and marketing, application of soil amendments for increasing yield capacity and sharing of information on the best agronomic practices among others. This finding thus implies that farmer groups help individual farmers' capacity to produce more maize, other factors remaining favorable in Hoima District.

4.3.6 Regression analysis testing the research hypothesis

A regression analysis was conducted to measure the extent to which group factors influenced maize production using the adjusted R^2 values, standardized beta values, t values and the significance measured at 0.05 confidence level. The following results were obtained;

Table 4.6: Regression results between Group Factors and Maize yields

Predictor	Adjusted R Square	df	Mean square	F	Sig.
	.507	1	.172	.321	.024[a]
	Unstandardized Coefficients		Standardized coefficients	T	Sig.
	Std error	Beta(b)			
Constant	.411			4.785	.000
Group factors	.319	.198		.412	.000

a.   Predictor: (constant), Group Factors

b.   Dependent Variable: Maize yields

The regression results in Table 4.6 show adjusted R^2 value of 0.507 between group factors and maize yields suggesting that group factors predicted 50.7% variation in maize production. The regression models ($\beta = 0.198, p = 0.000 < 0.05$) implies that a unit change in the group factors brought about a positive variation in the potential of an individual farmers in producing maize by 19.8 times or explained 50.7% of variation in output in maize production. The farmers thus, who belonged to farmer groups were 19.8 times more productive in terms of maize production compared to those that never belonged to any farmer group and thus produced more maize for sale and home consumption making the farmers in groups to be averagely richer and food secure than those who never belonged to groups. Therefore, the null hypothesis that smallholder farmer groups have no significant role to production, processing and marketing of maize was rejected by this study. This finding thus implies that by and large, the dynamics in the farmer groups are very critical in influencing the capacity of the individual farmers to achieve higher and improved levels of maize production in Hoima District.

4.4 Factors that enable smallholder farmer groups to improve the marketing situation of maize produce

The opinion of the respondents was sought on the factors enabling the small holder farmers to improve on marketing situation of maize produce. Twelve (12) questions were set to test the knowledge of the respondents on the factors that enable the small holder groups to improve the marketing situation of the farmers. The following results were obtained;

Table 4. 7: Opinion of the respondents on the farmer group factors that have improved on the marketing situation of maize produce

Farmer Group factors	N	A	D	UD	Mean	Std. Dev
1. They promote improved access to market	136	128(94.1%)	0(0.0%)	8(5.9%)	4.43	.59
2. They help members to aggregate	140	121(86.4%)	15(10.7%)	4(2.9%)	3.97	.79
3. They help members to improve the volume of produce	140	116(82.9%)	20(14.3%)	4(2.9%)	4.07	1.08
4. They promote information sharing among members	140	119(85%)	15(10.7%)	6(4.3%)	4.25	.96
5. Facilitate the reduction of opportunistic behavior among members	140	94(67.1%)	22(15.7%)	24(17.1%)	3.80	1.16
6. They facilitate collective decision making on maize production and processing	140	122(86.9%)	10(7.2%)	8(5.7%)	4.14	.91
7. Help members to lower screening costs	140	124(88.6%)	12(8.6%)	4(2.9%)	4.40	.88
8. Reduce time	140	123(80.7%)	11(7.9%)	16(11.4%)	4.25	.96
9. Reduce the cost of marketing	140	129(92.1%)	11(7.9%)	0(0.0%)	4.27	.92
10. Play a big role on poverty reduction by increasing local members' incomes	140	124(88.6%)	12(8.6%)	4(2.9%)	4.21	.85
11. They attract other development actors	140	101(72.2%)	27(19.3%)	12(8.6%)	4.37	.78
12. Promote stakeholder intervention for example government	140	116(82.9%)	16(11.4%)	8(5.7%)	4.40	.92

A=Agreed, D=Disagreed, UD=Undecided (No Opinion)

The rating scale was Likert scale which stood as follows for interpreting Mean: 1-2.49=Disagreed, 2.5-3.49= Undecided, 3.5-5.00=Agreed

The promotion of improved access on market from Table 4.7 shows that majority of the respondents, 128(94.1%) agreed that their groups promoted improved access to market. This was further confirmed by the high mean value (Mean=4.43, St. Dev=0.59). Majority of the respondents 121 (86.4%), further agreed that their group improved on social cohesion between

the members as it helped in aggregating the members. This is equally shown by the mean value (Mean=3.97, St.Dev. =0.79) while majority, 116(82.9%) equally agreed that the groups had helped to improve on the volume of maize produce. As also confirmed by the mean value (Mean=4.07, St.Dev. =1.08), the respondents attested that they had realized high returns from their gardens in the consecutive seasons for the last five years. On average, an individual farmer, committed to their work could harvest two metric tonnes of maize, up from 400-700 kilograms before they joined the farmer groups. The availability of market both in Hoima District, Democratic Republic Congo and South Sudan as well as internally in many towns of Uganda gave an impetus to the farmers to produce more maize for the market.

 The promotion of information sharing among members' shows that majority of the respondents, 119(85%) agreed that their group promoted market information sharing among the members. Information sharing is a critical component of commercial product. This was confirmed from the responses of the farmers as shown by the mean value (Mean=4.25, St. Dev=0.96) that the availing of information on markets and prices by the groups induced the farmers to produce more maize aware that market was available or potential market existed at a future date. Through FGDs with the farmers, it was reported that the improved access to markets and trust in the partnerships greatly improved on the sharing of information amongst the group members which improved on the propensity of the group members to adopt better maize agronomic practices such as use of organic soil amendments, post-harvest handling technology, so forth. This greatly improved on the productivity of the farmers in the farmer groups of Hoima District. Presently, the least farmer produces a metric tonne of maize every harvest.

The facilitation of collective decision making on maize production and processing shows that majority of the respondents, 122(86.9%) further agreed the farmer groups further facilitated the

reduction of opportunistic behaviour among the members. On helping members to lower screening costs, majority of the respondents 124(88.6%) agreed that farmer groups have further facilitated collective decision making among the farmers on production, processing and marketing activities of maize. As a result, majority of the respondents, 123(80.7%) agreed that this has helped to lower the screening costs. The mean values, 3.80, 4.14 and 4.40 respectively further provide proof that group membership has greatly improved the marketing performance of the maize farmers in Hoima District as they have reduced on the time spent on looking out for markets for their maize produce.

Study findings on reduced cost of marketing show that majority of the respondents, 129(92.1%) further showed that the farmers groups had helped to reduce on the individual farmer's transaction costs. As shown by the mean (Mean=4.27, St. Dev=0.92), the groups have collective means of transporting the produce from the farmers to the collecting centres. Through FGDs, the farmers revealed that this has helped to reduce on the levels of transaction costs, even for the case of inputs like fertilizers which are collectively transported from the sources to designated farmer centres. On a big role on poverty reduction by increasing local members' incomes, majority of the respondents, 124(88.6%) agreed that this greatly improved on the incomes of members. The mean value, (Mean=4.21, St. Dev=0.85) shows that the increased incomes have led to a reduction in the levels of poverty and has further attracted other development partners or actors. Majority of the respondents, 101(72.2%) agreed that farmer groups induced intervention of the government to promote stakeholder partnerships. The mean value (Mean=4.37, St. Dev=0.78) further shows that the partnerships have eased the marketing of the maize basing on the recommendations and leads by the government to the development partners who buy maize grain in bulk (Mean=4.40, St. Dev=0.92). Belongingness to a farmer's groups has therefore greatly boosted the marketing performance of the maize farmers in Hoima District.

4.4.1 Association between group membership and improvement in maize marketing

The group membership of the respondents was associated with improvement in the marketing situation of maize produced. The following results were obtained;

Table 4.8: Group membership and improved marketing situation

			Group A	Group B	Group C	Group D	Total
				Groups (n=140)			
Has the marketing	Yes	Count	35	80	19	3	137
Situation of your maize improved?	No	Count	2	1	0	0	3
Total		Count	37	81	19	3	140

χ^2=19.379 df=2, p=.000

The chi-square test results obtained was χ^2=19.379 df= 2, p=.000. This result means that there was a significant relationship between membership in farmer's group and improved marketing of maize produced. Farmers bargaining position has greatly increased, emphasis of the groups on quality harvest has sustained the market levels. These finding tallies with the responses from key informant interviews from where it was confirmed that by default, farmers groups gave priority to marketing all the maize produced by the members. It was further established that marketing improvement was by far the most overarching objective on which the formation of most of the farmers groups was based and continues to be one of the most important core objectives. The HODFA officials indicated that maize from farmers groups in the District has been improved because of emphasis on quality.

4.5 Challenges faced by smallholder farmer groups in a bid to uplift output, food security and incomes

The challenges faced by farmer groups in a bid to uplift output, food security and incomes are shown in Table 4.9;

Table 4.9: Opinion of the respondents on the challenges facing the small holder groups in the quest to uplift output, food security and incomes.

Challenges	N	A	D	UD	Mean	Std. Dev
1. Lack of enough accountability	140	88(62.9%)	48(34.3%)	4(2.9%)	3.79	1.42
2. Lack of ethics among group leaders	140	103(73.6%)	37(26.5%)	0(0.0%)	3.96	1.19
3. Lack of transparency among members	140	110(78.6%)	30(21.5%)	0(0.0%)	3.88	1.33
4. Lack of information	129	72(56.2%)	56(43.8%)	0(0.0%)	3.91	1.17
5. Lack of enough agricultural credit facilities	132	80(60.8%)	52(39.4%)	0(0.0%)	4.00	1.41
6. Lack of access to advisory services	132	79(69.8%)	32(24.2%)	21(15.9%)	3.71	1.16
7. Lack of good practices	140	85(60.8%)	48(34.3%)	7(5.0%)	3.99	1.02
8. Poor institutional infrastructure	132	97(68.3%)	43(31.7%)	0(0.0%)	3.68	1.37
9. Climate variability and change	140	103(73.6%)	21(15.0%)	16(11.4%)	4.17	1.18
10. Lack of enough access to land	132	104(78.8%)	16(12.1%)	12(9.1%)	4.25	1.01
11. Poor technological gear	132	116(87.9%)	16(12.1%)	0(0.0%)	4.48	1.03
12. High transaction costs due to institutional problems	129	84(65.6%)	44(34.4%)	0(0.0%)	4.61	.65
13. Pests and diseases	136	128(94.3%)	8(5.7%)	0(0.0%)	4.70	.80
14. Lack of processing knowledge	140	136(97.1%)	4(2.9%)	0(0.0%)	4.79	.65
15. Lack of processing skills	140	123(87.9%)	17(12.1%)	0(0.0%)	4.80	.64

A=Agreed, D=Disagreed, UD=Undecided (No Opinion)

The rating scale was Likert scale which stood as follows for interpreting Mean: 1-2.49=Disagreed, 2.5-3.49= Undecided, 3.5-5.00=Agreed

Lack of enough accountability in Table 4.9 above shows that majority of the respondents, 88(62.9%) agreed that they faced a challenge of lack of adequate accountability. The finding was further indicated by the mean value (Mean=3.79, St. Dev=1.42) which further proved farmer groups were faced with a challenge of lack of proper accountability mechanism for the group administrative and operational activities. As a result, majority of the respondents, 103 (73.6%) indicates that they equally agreed that there were ethical problems among the group leaders. This was further shown by the mean (Mean=3.96, St. Deviation=1.19) suggesting that there were ethical problems in the management of the farmer groups that affected the performance of the farmers somehow in maize production. Further, majority of the respondents, 110 (78.6%) agreed that there was lack of transparency among the members. The mean value (Mean=3.98, St. Dev. =1.33) showed that there was lack of transparency because of lack of proper accountability mechanisms that bred unethical leadership in the farmer groups.

Lack of information shows that majority of the respondents, 72 (56.2%) agreed that they lacked agronomic and market information. This was further confirmed by the (Mean=3.91, St. Dev=1.17) which meant that the farmer groups faced the challenge of accessing adequate information on markets and as well agronomic practices in the maize sector. Study findings on lack of enough agricultural credit facilities show that majority of the respondents, 80(60.8%) faced a challenge of lack of enough agricultural credit facilities in their group. This was further shown by mean (Mean=4.00, St. Dev =1.41), which highlighted that farmers never accessed credit from their groups, but rather relied on credit facilities extended to their group by financial institutions such as Microfinance firms. From FGDs, it was revealed that this kind of credit is not reliable and sometimes does not suit the needs of the maize farmers.

Lack of access to advisory services shows that majority of the respondents, 79(69.8%) agreed that existed a problem of lack of access to advisory services and yet these are very important in maize or any other sector of farming that is market oriented. As revealed by the respondents in FGDs, the farmers on most occasions failed to meet the set specifications of some buyers because they lacked the advice on how best they could achieve that. This was further confirmed by the mean (Mean=3.71, St. Dev = 1.16), which implied that there was gross lack of advisory services for the maize farmers. Lack of good practices shows that majority of the respondents, 85(60.8%) mentioned the challenge of lack of good agronomic practices. This was further confirmed by the (Mean=3.99, St. Dev =1.02) which indicated that majority agreed that some farmers in their group applied traditional and conventional maize farming techniques that often uses rudimentary tools such as slashers and pick axes to clear the gardens as well as poor storage systems. Such cannot encourage large scale maize production as illustrated by Figure 4.8;

a) *Poor storage structure*　　　　　　b) *Improved storage structure*

Figure 4. 8: Maize Storage System

Poor institutional infrastructure shows that majority of the respondents, 97(68.3%) agreed that the farmer groups faced a challenge of poor institutional infrastructure. Through FGDs, the

respondents mentioned specific facilities that were lacking in their group such as computers which are necessary for records management. In addition, the groups never owned a maize drying machine but rather relied on HODFA. This implied a cost on the groups to have their maize dried whenever they got a reliable market from an international buyer where standards are very key. The gravity of this problem was further indicated by the mean (Mean=3.68, St. Dev =1.37) which meant that the farmer groups selected for this study lacked the necessary and requisite infrastructure. Through interviews with HODFA and District Production and Marketing Department, the sampled groups were model groups. This by implication meant that lack of requisite facilities and infrastructure has a significant impact on the scope and capacity of the maize farmers to harness the comparative advantage of their groups to boost their productive capacity beyond what "is" now. Figure 4.9 shows the sample records kept by farmer group.

Figure 4. 9: Rudimentary methods of records keeping and management among the groups

Climate variability and change shows that majority of the respondents, 103(73.6%) revealed that climate variability and change was one of the outstanding challenges that greatly affected the role of the farmers groups included. As further shown by the mean value (Mean= 4.17, St. Dev=1.18), the impact of climate was so pronounced to the extent that it plunged the farmers in losses. Through FGDs, majority of the participants attested that they relied on rain fed maize production system. Therefore, much as they have drought resistant varieties like Longe 11, they have not got varieties that are heavy rainfall resistant. It was further revealed through the FGDs that whenever there were heavy rains, their maize would have caterpillars inside that destroy a great bit of the cob. Therefore, the harvest made at the end of the season will mean that actual output is by far less than planned output. One of the respondents during the FGDs said "…., *Heavy rains lead to root rot and development of mold on maize cob before harvest while drought leads to the withering and drying of the maize plants*…". Through observation, it was established that heavy rains in the first season considered in this study, farmers incurred lots of losses as shown in Figure 4.10

Figure 4. 10: Rotten maize due to heavy rains

Poor technological gear shows that majority of the respondents, 116(87.9%) agreed that the members in their group faced a challenge of lack of adequate capital that made them to rely on the use of substandard technology for both land preparation for maize planting and post-harvest

handling. This was further confirmed by the mean (Mean=4.25, St. Dev=1.01) which ideally meant that farmers continue to be reliant on less efficient, manual based and less effective technology such as reliance on the use of the hand hoe and yet the terrain of the area which undulating provides favourable conditions for mechanization of operations. Maize growing in Hoima District is an extensive form of farming where mechanization would be ably and easily applied for desirable and better results. The gravity of this problem was further illuminated by HODFA, District Production and Marketing Officials when they mentioned that absence of modest technology among the groups tied their farming operations to use of obsolete and out fashioned technology that does not allure effective, economic and efficient production of high quality maize harvest.

High transaction costs due to institutional problems shows that majority of the respondents, 84(65.6%) agreed that they faced high transaction costs due to structural and institutional problems (Mean=4.48, St. Dev=1.03) and equally agreed, 128(94.3%) that their productivity was affected by the rampant outbreaks of maize diseases such as   bacterial stalk rot and pests like the caterpillars that have of the recent past left many farmers in different parts of Uganda in terrible losses (Mean=4.70, St. Dev=0.80). These have equally reduced on the effectiveness of the farmers in producing quality maize.

Lack of processing knowledge shows that majority of the respondents, 136(97.1%) agreed that they lacked processing knowledge. One of the goals of this study was to examine the techniques used in processing and value addition of the maize harvested by farmers in the selected groups. However, the findings indicated that processing was rarely done. This observation is further confirmed by the mean value (Mean=4.79, St.Dev. =0.65) which shows that majority of the farmers had heard about processing of maize, but such was not a common practice under their group. As a result, the farmers lacked skills for processing maize. This is shown on lack of

processing skills where majority of the respondents, 123(87.9%) agreed that they lacked processing skills which included milling of the maize seeds into flour or bran and or any other value-added activity that would make their produce more competitive and marketable. The mean value (Mean=4.80, St. Dev =0.64) therefore provided further evidence that farmers in the selected groups hardly added value to their maize after harvesting. Through FGDs, it was established that the majority of the farmers lacked processing knowledge and skills which somewhat makes a little difference between them and other farmers who are still reluctant to join the operational farmer groups in Hoima District.

CHAPTER FIVE

DISCUSSION OF THE RESULTS

5.1 Introduction

The chapter presents an analysis and discussion of the study findings. The analysis and discussion of the findings is made under themes that were used to present the study findings in the preceding chapter and is supported by literature that was reviewed in Chapter Two.

5.2 The role of smallholder farmer groups on production, processing and marketing of maize

Farmer groups in Hoima District ensured collective decision making more so on market ventures and emphasized quality grain production. These attributes have steadily transformed the subsistence orientedness of the farmers into commercial maize farming. Equally, the groups support market price and this has enabled the farmers to make predictions of how the future market for maize might be basing on the forecast results. Shiferaw, Obare and Muricho (2006) argued that smallholder farmer groups help the members to lower grading and sorting costs. Sharing information also reduces the cost of searching for market information, which entails transaction costs. Cooperation amongst farmers in negotiating prices with traders as shown by 91% of the respondents, increase their bargaining power and empowers them to have greater control over the setting of prices and reduces the time and the cost of marketing.

Ensuring high quality produce through value addition or proper grading shows that majority of the respondents, 96(68.5%) agreed that they had benefitted from group membership as quality through value addition and grading are emphasized. As further confirmed by Jjuuko (2008), group membership enabled the maize farmers to sell their produce at high price (UGX, 1200) for

a kilogram of sorted and graded maize instead of UGX 800 for ordinary. The value addition however was not commonly practiced and therefore, its benefits were not spread across the seasons. The respondents attested that much has been done into post-harvest handling and storage all of which have brought about an improvement in the productivity of the farmers and thus improvement in processing of maize by farmers in Hoima district.

The formation of market committees among the members as agreed to by the majority of the respondents (81%) for example is another key development milestone that spurs farmers or the members to higher levels of maize production. The increased maize production in the groups is facilitated by the closed tender system which seals the farmers from shocks of overproduction and low prices. The close tender system adopted by the farmers groups boosts the price levels hence insuring the farmers from the possibility of being cheated by middle men, who in the past have always bought maize from the farmers at very low farm gate prices and later sold the maize at higher prices making exorbitant profits. The improvement in the bargaining power of the farmers through collective efforts greatly induces high productivity among the maize farmers in a group.

A positive significant relationship was established between farmer group factors and maize production capacity (r= .643* p=0.012<0.05) implying that there was a high positive correlation between farmer group factors and maize production capacity. The regression results equally indicated that the dynamics in the farmer groups are very critical in influencing the capacity of the individual farmers to achieve higher and improved levels of maize production in Hoima District. Therefore, belongingness to a farmer group improves productivity of individual maize farmers. The study findings are supported by those of Blandon et al., (2009) who found out that smallholder farmer organizations have boosted maize productivity and further enabled the

farmers to have improved access to market for their products at a fairer price. The findings are further amplified by World Bank (2011) which observed that the smallholder farmers' groups help members by aggregating the volume of produce over the number of producers. The farmer groups equally lay strategies for finding traders interested in buying, negotiating for best price and quality specifications.

5.3 Factors that enable smallholder farmer groups to improve the marketing situation of maize produce

Collective bargaining and marketing of the produce have promoted the development of strong stakeholder partnerships between the farmers and funding agencies such as Abi-Trust, Swedish Development Agency and World Vision. The partnerships have improved on access of information and exposure to hybrid training which has facilitated the development of man power resources for national development. This observation is in consonance with those of Kherallah and Kirsten (2002) who argued that overcoming the problem of high transaction costs requires that smallholder farmer groups rely on external rather than internal economies of scale through collective action.

Equally, the market information provided by the farmer groups is essential not only for the formulation of a proper pricing policy, but also aids them in improving their marketing performance. Therefore, the accurate, adequate and timely information on all aspects of maize has increased on the efficiency of the operations. For example, some farmers have signed memoranda of understanding to engage in contract maize farming and production. This information is important to the farmers as it will assist them in planning production and harvesting dates, and give guidance on time, place and price at which to sell their maize produce.

The chi-square test results obtained between small holder group factors (such as collective bargaining, collective transportation, ease in accessing market at national and international levels and pooling of resources) exposed farmers to strategic networks hence improving on the marketability of the maize produced (χ^2=19.379 df=2, p=.000) suggested that farmer groups have improved on the ease with which the farmers can sell their maize both to local and international buyers. The collective efforts of the farmer groups, for example, increased on the solidarity of the members hence leading to higher volume of maize produce for the ready and established markets. Collective bargaining helps to reduce on the individual farmer's transaction costs. The study findings found credence in the observations of Ali and Kumar (2011) that high transaction costs constrain growth of smallholder farmers especially due to poor infrastructure. A poor road network, for example, and unreliable distribution of maize will force farmers to grow their own food and less of perishable commodities causing a lower productivity. Increased cost of transport will also affect inputs used and the market strategies followed by the farmers.

5.4 Challenges farmer groups face in a bid to uplift output, food security and incomes

Farmers in Hoima District, as is the case with most other parts of Uganda, depend on rainfed agriculture. Maize production was subject to climate variability and change. Dependency of farmers on rain fed farming is a risk on its own as it reduces the possibility of achieving stable yields, incomes and food security. This observation rhymes with Sseguya *et al* (2018) who noted that there was inconsistency in production among smallholder farmers coupled with lack of bargaining power. Further, they found out that most smallholder farmers are not consistent in terms of producing products and supplying them to fresh produce markets and agro-processing industries.

None of the groups was engaged in maize processing. The FGD and interview responses established that maize processing requires colossal sums of money. The respondents revealed that the amount of collateral security required is far too high and is beyond the book value of any of the groups or even to put it best, above the consolidated book value of all the four groups studied. As such, the farmers continue to make severe losses as they store the maize in unprocessed form. Consequently, this has greatly affected the efforts of the farmers to achieving food security, increased income from maize production and improved livelihoods. Okoko *et al*. (2008) observed that the lack of good practices such as storage and ethics of managing group enterprises by the group leaders, often carrying out their functions with little or no respect for accountability and transparency principles, misuse of authority and group finances by the leaders, inducing mistrust, were alleged to be some of the main reasons for ineffectiveness/failure of some groups in Kenya. The situation established in Hoima is a replica of what Okoko *et al* (2008) established in Kenya. Farmer group heads were treated with suspicion by the members. By and large, this has affected the role and performance of the members in the groups.

The study findings are further supported by the observations of Okori (2011) who established that smallholder farmers in rural areas face several challenges i

ncluding limited market and market access, poor infrastructure, high costs and limited access to improved inputs , output market and production technologies, lack of agricultural credit facilities and inadequate manpower especially extension services, unreliable data due to lack of quality research, lack of processing knowledge, poor coordination of producers, global price increases and lack of ownership and control of land especially for women. Therefore, much as the farmer groups have transformed the potential of the members in regard to production and marketing,

there are a number of structural rigidities such as inability to process their maize to add value, social mobility, high level of unemployment, insufficient innovation among others and socio-economic challenges such as poverty, lack of education, over population and corruption that ought to be mitigated.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter contains the summary of results, conclusions and recommendations of the study.

The results meet the objectives and answer the questions raised in the study while the conclusion and recommendation emanated from the findings generated.

6.2 Summary of Results

The study examined the role of smallholder farmers groups in production, processing and marketing of maize in Hoima District. Four groups were selected from four sub counties, one group per sub county. The study findings indicated that to a great extent, the farmer groups have boosted the productivity of maize farmers. The study made a comparison of the current situation of the members and what it was before they joined. Majority agreed that while they produced less than a tonne per season before, currently, on average, each member farmer produces at least two metric tonnes of maize every season.

The group factors that were behind the success included joint planning, accesss to better markets because of collective bargaining power, adoption of better and improved maize varieties such as the latest Longe 11 and collaborative relationships with international donor agencies such as Abi-Trust and USAID. These have not only boosted farmer skills through training but have also linked the farmer groups to potential markets. However, the study findings showed that despite the success registered by the farmers in accessing better markets, improved production and

indirect benefits from networking with international organizations, there are a series of structural and group based challenges hampering the effective roles and performance of the farmer groups.

The natural and structural challenges include: poor feeder roads and transport, vagaries of weather, lack of access to the needed credit facilities such as for securing processing machines for maize value addition while group based factors include poor leadership and poor accountability and transparency. Collectivelly, the challenges have affected the effective and efficient roles and performance of maize farmers.

6.3 Conclusions

1. Farmer groups have boosted maize production in Hoima District. The productivity of the members to the groups has greatly improved over the last couple of years. For example, between 2014 and 2017, an average member of each of the groups harvested a minimum of 2 metric tonnes of maize grain every season, up from 800 kilograms as the average capacity of each member before 2014.

2. The ideals realized by the farmer groups associated with the enormous increase in maize production include, among others: collective bargaining, market and price forecasting, collective decision making, skills acquisition, knowledge sharing and transfer between and among the members through benchmarking. This has helped to stabilize the incomes of some of the members. Equally, it has boosted the productivity of the maize farmers as well as food security.

However, the dividends of belongingness to farmers' groups were not evenly distributed to all the groups. The reasons for unequal distribution of dividends were largely due to the differences in individual characteristics such as leadership, level of education and ownership of strategic resources such as land.

3. There are a series of challenges faced that have greatly reduced the effectiveness of all the groups. These are both natural, structural and group based. The natural and structural problems include climatic changes, limited access to credit for improvement of the farming gear among others. Group based challenges included unethical leadership which was not transparent and lack of adequate agronomic and marketing information. That said, collectively, it was concluded that there were challenges that derailed the efforts of some members from achieving stable incomes, food security and steady output.

6.4 Recommendations

From the preceding discussion and conclusions, the researcher recommends that the following be worked upon if the benefits of farmer groups are to become sustainable;

1. There is need for provision of extension services to all the farmer groups in Hoima District. The extension services are important as they will facilitate the process of knowledge transfer, monitoring the role of the maize farmer groups and as well as providing the needed information regarding the new and trending innovations such as high yielding and quick maturing maize seeds that farmers might not have known about.

2. There is need by the government to upgrade the feeder roads in rural Hoima. The rural areas are the buffer production centres but are dotted with seasonal roads which inhibit the transportation of the maize produce from the farms to the collecting centres that are based in Hoima Municipality.

3. Government should engage monitoring committees at the District and sub county levels to protect the farmers from being cheated by seed dealers, who often have sold fake seeds and soil amendments to the maize farmers in Hoima District,

4. Government should channel part of the *Bona Bagaggawale* funds into Savings and Credit Cooperative Organizations as low-cost loans for maize farmers to enable them mechanize their operations especially in storage and processing of the maize. This is important given that Vision 2030 defines one of the efforts of the Government of Uganda in achieving the Vision as Value addition and creation among the small holders. In Hoima, most of the farmers are still dependent on the hand hoe and yet the terrain of the area is so favorable in a way that it would support mechanized farming. Mechanized maize farming is further made possible by land consolidation in the area.

5. There is need for the government to consider providing management refresher training to the leaders of the farmer groups. The training is critical as it will help to mitigate the institutional weaknesses such as lack of access to information and failure to easily decode the information accessed as was observed in this study. Lack of access to information and difficulty in decoding the little information obtained was blamed on illiteracy of the farmers.

6. There is need for introducing functional adult literacy in the farmers groups. This should be made a core activity in order to enable the group members acquire basic literacy skills that are very crucial especially in the rolling out of the new technologies and agronomic practices as the farmers will after the training have a high capacity of decoding the technology information packs and any other associated information disseminated after adoption has occurred.

7. The farmers should be taught better post-harvest handling techniques such as automated maize drying and processing into by-products such as maize flour and bran to reduce on the spate of maize harvest losses. The training is important because it will further

provide a basis on which the quality of maize harvest can be raised and maintained. This training is needed because most of the farmers spread maize harvested on bare ground to dry. This reduces on the quality of the dry maize as it will be contaminated with dust.

8. There is need of training of the farmers in the basics of maize production such as timely planting, weeding, the quality and quantity of the fertilizers to apply, timely harvesting and application of pesticides on the harvested maize. This will enable the farmers to produce desired quality and quantity of maize.

6.5 Areas for further research

More research should be carried out on the following topics;

i. Value addition in maize production in Uganda.

ii. Economics of maize growing through groups.

iii. Study on factors using factor analysis on production, processing and marking of maize

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APPEENICES

Appendix A: Introductory Letter

KYAMBOGO UNIVERSITY

P. O. BOX 1 KYAMBOGO

Tel: 041 - 4286792 Fax: 256-41-220464

Website: www.kyu.ac.ug

Office of the Dean, Graduate School
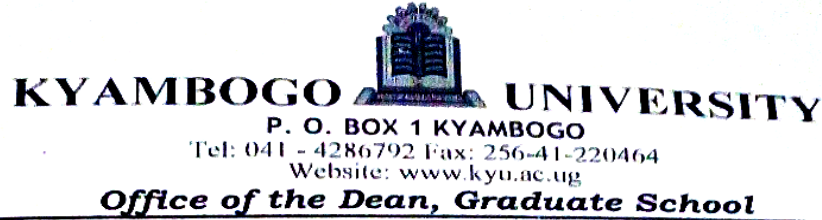
24th August 2017

To Whom It May Concern

RE: LETTER OF INTRODUCTION

Dear Sir/Madam,

This is to introduce **Ms Kasemire Shamin** Registration Number **15/U/14384/MAE/PE** who is a student of Kyambogo University pursuing a Masters Degree.

She intends to carry out research on **"Performance of Smallholder farmer groups in Uganda: A case study of Maize Production in Hoima District"** as partial fulfillment of the requirements for the award of the Master of Agricultural Education and Extension.

We therefore kindly request you to grant her permission to carry out this study in your institution.

Any assistance accorded to her will be highly appreciated.

Yours sincerely,

Assoc. Prof. Muhamud N. Wambede

DEAN, GRADUATE SCHOOL

KYAMBOGO UNIVERSITY

★ 2 4 AUG 2017 ★

OFFICE OF THE

GRADUATE SCHOOL
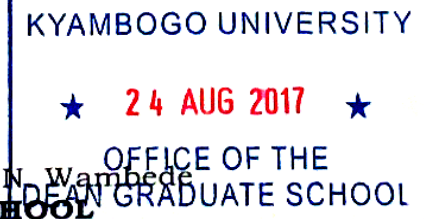
Appendix B: Acceptance Letter, Hoima District Local Government

Telephones:

Chief Administrative Officer	0772-868383
Chief Finance Officer	0772-819184
District Health Officer	0772-611467
District Planner	0772-437940
District Engineer	0772-420042
DPMO	0772-640527

THE REPUBLIC OF UGANDA

OFFICE OF THE DISTRICT PRODUCTION AND
MARKETING OFFICER
HOIMA DISTRICT LOCAL GOVERNMENT
P. O. BOX 2
HOIMA - UGANDA
Email: caohoima@yahoo.com

In any correspondences on
These matters please quote Ref: No. DPMO: 150/2

Monday, August 29, 2017

To: Ms. Kasemire Shamim
Reg. No. 15/U/14384/MAE/PE

PERMISSION TO CONDUCT RESEARCH FOR YOUR MASTER'S PROGRAM IN HOIMA DISTRICT

Reference is hereby made to the introductory letter dated 24th August 2017 on the above subject.

You are hereby permitted to proceed with data collection for your research entitled "Performance of smallholder farmer groups in Uganda: A case study of Maize Production in Hoima District" in the different Lower Local Governments or sub-counties.

Please remember to share your findings with the district.

Thank you.

DR. KAJURA CHARLES
DISTRICT PRODUCTION AND MARKETING OFFICER

c.c The Dean, Graduate School, Kyambogo University, **Kampala**
c.c The Chief Administrative Officer, **Hoima**
c.c All Sub-county Chiefs, **Hoima**

Appendix C: Questionnaire

Dear Sir/ Madam,

I am Kasemire Shamim, a student at Kyambogo University pursuing a master's degree in Agricultural Education and Extension. I am carrying out a study assessing the role of smallholder farmer groups on production, processing and marketing of maize: A case study of Hoima District. You are kindly requested to participate in the study and feel free because your information will be kept confidential.

Instructions:

Please tick an option you consider the most appropriate to you.

Section A: Bio Data

1) Sex of respondent

    a) Male ☐

    b) Female ☐

2) Age group

    a) 20-30 years ☐

    b) 31-40 years ☐

    c) 41– 50 years ☐

    d) 50 years and above ☐

3) Your marital status

    a) Married ☐

    b) Single ☐

    c) Divorced ☐

    d) Widowed ☐

4) Level of Education

    a) Degree ☐

    b) Diploma ☐

    c) Secondary level ☐

    d) Primary level ☐

    e) Others specify ………………………………………………………………….

5) Level of working experience in smallholder group farming in maize production

    a) 1 to 2 years   ☐

    b) 3 to 4 years   ☐

    c) 5 to 6 years   ☐

    d) 7 and above   ☐

6) Any other personal factor that disables you from active group participation

a) Ill health ☐   b) disability ☐   c) distance to work ☐   d) laziness ☐

SECTION B: The role of smallholder farmer groups on production, processing and marketing of maize

Please select the responses that most closely represent your point of view regarding the following statements:

7. What is the role of your smallholder farmer group on production, processing and marketing of maize in Hoima District?

   i.   They promote improved access to market

        Strongly Disagree ☐ Disagree ☐   No opinion ☐   Agree ☐   Strongly Agree ☐

   ii.   They help members to aggregate

        Strongly Disagree ☐ Disagree ☐   No opinion ☐   Agree ☐   Strongly Agree ☐

   iii.   They help members to improve the volume of produce

        Strongly Disagree ☐ Disagree ☐   No opinion ☐   Agree ☐   Strongly Agree ☐

   iv.   They promote sharing of information among members

        Strongly Disagree ☐ Disagree ☐   No opinion ☐   Agree ☐   Strongly Agree ☐

   v.   Facilitate the reduction of opportunistic behavior among members

        Strongly Disagree ☐ Disagree ☐   No opinion ☐   Agree ☐   Strongly Agree ☐

   vi.   They facilitate collective decision-making on maize production and processing.

        Strongly Disagree ☐ Disagree ☐   No opinion ☐   Agree ☐   Strongly Agree ☐

   vii.   Help members to lower screening costs (research costs)

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

viii.   Reduces time

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

ix.   Reduce the cost of marketing

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

x.   Play a big role on poverty reduction by increasing local member's incomes

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xi.   They increase rural employment

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xii.   They attract other development actors (such as donors, NGOs) into the community

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xiii.   Promote stakeholders' intervention for example Government (operation wealth creation).

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xiv.   Others specify

a.   ………………………………………………………………………………………

b.   ………………………………………………………………………………………

SECTION C: Factors that enable smallholder farmer groups to improve the production, processing and marketing of maize

Please select the responses that most closely represent your point of view regarding the following statements:

6. What are the factors that enable your smallholder farmer group to improve the production, processing and marketing of maize?

i.   Ensuring collective decision making on market ventures

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

ii.   Ensuring high quality produce through value addition or proper grading.

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

iii.   Focusing from production-related programs to market-oriented interventions

Strongly Disagree ☐Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

iv. Make through research about the price levels elsewhere

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

v. Forming marketing committees within the farmer groups

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

vi. Improving bargaining power through agricultural co-operatives?

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

vii. Promoting resource sharing

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

viii. Considering consumer tastes, expectations

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

ix. Considering consumer preferences

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

x. Apply good farming techniques

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

xi. Use high quantity produce

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

xii. Others specify

a. ……………………………………………………………………………………
b. ……………………………………………………………………………………
c. ……………………………………………………………………………………

SECTION D: Challenges Faced By Smallholder Farmer Groups

Please select the responses that most closely represent your point of view regarding the following statements:

8. What challenges do you face during the maize production for food security and incomes or (day today group activities)?

i. Lack of good practices

Strongly Disagree ▢Disagree▢   No opinion ▢   Agree ▢   Strongly Agree ▢

ii.   Lack of ethics among group leaders

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

iii.   Lack of enough accountability

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

iv.   Lack of transparency among members

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

v.   Climate variability and change (heavy rainfall and drought)

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

vi.   Poor physical

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

vii.   Poor institutional infrastructure

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

viii.   Lack of information

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

ix.   Lack of access to advisory services

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

x.   High transaction costs due to institutional problems

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xi.   Lack of human capital (inadequate manpower)

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xii.   Poor technological

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xiii.   Lack of enough agricultural credit facilities

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xiv.   Pests and diseases

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xv.   Lack of processing knowledge

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xvi.   Lack of processing skills

Strongly Disagree ☐ Disagree☐   No opinion ☐   Agree ☐   Strongly Agree ☐

xvii.   Others specify

    a. ………………………………………………………………………………………
    b. ………………………………………………………………………………………
    c. ………………………………………………………………………………………

Thank you very much for your cooperation

Appendix D: Interview Guide

Dear Sir/ Madam,

I am Kasemire Shamim, a student at Kyambogo University pursuing a master's degree in Agricultural Education and Extension. I am carrying out a study assessing the role of smallholder farmer groups on production, processing and marketing of maize: A case study of Hoima District. You are kindly requested to participate in the study and feel free because your information will be kept confidential.

1. Sex

……………………………………………………………………………………………

2. What is your marital status?

……………………………………………………………………………………………

3. How old are you?

……………………………………………………………………………………………

4. What is your highest level of education?

……………………………………………………………………………………………

5. For how long have you been in group farming?

……………………………………………………………………………………………

6. What is the role of your smallholder farmer group on production, processing and marketing of maize in Hoima District?

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7. What are the factors that enable your group to improve the production, processing and marketing of your produce?

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8. What challenges do you face during the implementation and practice of your day to day farming and production activities?

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9. HOUSEHOLD MAIZE INSECURITY AND COPING STRATEGIES					
In the **last season**, how frequently did your household resort to using one or more of the following strategies in order to meet your household needs? **COMPLETE EACH STRATEGY IF THE RESPONSE IS YES**					
Strategy	No	Yes	How many times/month	How many times/week	How many times/daily
9.1 Skip entire day without eating maize					
9.2 Limit portion size at meal times					
9.3 Borrow maize from friends or relatives					
9.4 Eat poor quality maize and keep the good quality aside for sale					
9.5 Purchase maize on credit					
9.6 Children eat elsewhere because there is no enough maize at home					
9.6 Seek monetary help from friends or relatives to meet maize needs					
9.7 Eat less as a parent so that children can eat more					
9.8 Children go to bed hungry because there is no maize to eat					

Thank you very much for your cooperation

Appendix E: Focus Group Discussion

Dear Sir/ Madam,

I am Kasemire Shamim, a student at Kyambogo University pursuing a master's degree in Agricultural Education and Extension. I am carrying out a study assessing the role of smallholder farmer groups on production, processing and marketing of maize: A case study of Hoima District. You are kindly requested to participate in the study and feel free because your information will be kept confidential.

Instructions:

Please answer questions appropriately.

1.) Any group factors that disable you from active group participation

a) Ill health ☐   b) disability ☐   c) distance to work ☐   d) laziness ☐

SECTION B: Factors that enable smallholder farmer groups to improve the production, processing and marketing of maize

2. What are the factors that enable your smallholder farmer group to improve the production, processing and marketing of maize produce?

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SECTION C: The role of smallholder farmer groups on production, processing and marketing of maize in Hoima district

3. What is the role of your smallholder farmer group on production, processing and marketing of maize in Hoima District?

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SECTION D: Challenges faced by smallholder farmer groups

4. What challenges do you face during the production, processing and marketing of maize for food security and incomes or (day today group activities)?

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Thank you very much for your cooperation

Appendix F: Observation Guide

No	Item	Observation	Conclusion
1	Size of the farmer group		
2	Amount of land used for maize production		
3	Type of labour		
4	Processing facilities		
5	Storage facilities		
6	Metric tonnes of maize available for sale		
7	Metric tonnes of maize avaliabe for eating		
8	Value additional facilities		
9	Transport facility		
10	Group cohesiveness		
11	Gender		

Appendix G: Determination of Sample Size

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—N is population size.   S is sample size.

Source: Krejcie & Morgan, 1970

Appendix H: Map of Uganda Showing Hoima District

MAP OF UGANDA SHOWING ALL THE DISTRICTS AS OF JULY-2010

HOIMA DISTRICT
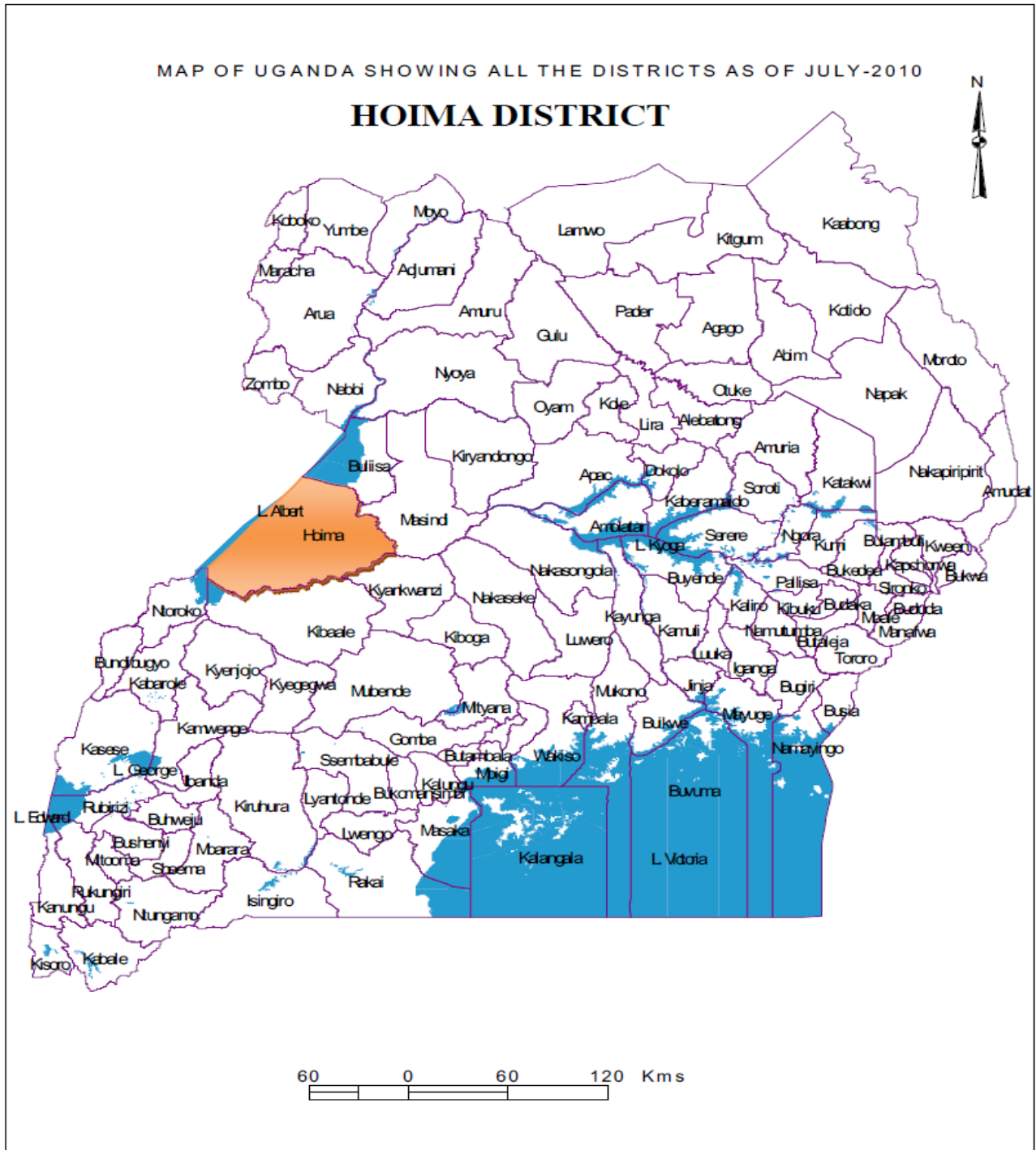
Appendix I: Map of Hoima Showing the Sub Counties studied.