

The contribution of Mukwano sunflower scheme to contracted small holder farmers' household food availability

A case study of farmers in Ogur sub county, Lira District, Uganda



A research project submitted to Van Hall Larenstein University of Applied Sciences in partial fulfillment of the requirements for the Degree of Master in Management of Development, specialization Rural Development and Food Security

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September, 2013

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ACKNOWLEDGEMENT

This academic journey was hectic and full of surprises. I thank God for fulfilling His promise of granting me life, wisdom, and good health whenever I asked. I want to extend my special thanks to the Dutch government for granting me the unique opportunity to study here in The Netherlands through the Nuffic funding. Further, my sincere thanks also go to Van Hall Larenstein University of Applied Sciences for offering me a place in the master's course and training me.

I would like to thank Dr. Suzanne Nederlof (FS course coordinator), Mr. Eddy Hesselink, and all lecturers that guided and instructed me till completing my studies successfully. Dr. Annemarie Westendorp thank you so much for your motherliness, concern for people and wise counsels.

In a special way, my profound appreciation go to my thesis supervisor Dr. Gerrit-Jan van Uffelen for his scholarly guidance, valuable contributions, and tutelage which greatly improved the quality of this work.

Indeed many people assisted me in one way or the other. I thank Mr. Peter Ajungu - the Lira District Production and Marketing Officer, Mr. Kizito Odongo, Mr. Robert Adwek of Mukwano group of Companies, and Mr. Walter Okidi, a friend and Extension Officer, for planning, coordinating and facilitating the research work.

Finally, I thank all my family members: Molly Ogwal (Mrs.), Elly, Ed, Suzan, Joan and Molly Agnes. You all kept me in prayers while away. To all I cannot mention by name, kindly take note of my deepest gratitude and God bless you all.

DEDICATION

I would like to dedicate this piece of work to Molly Ogwal, my lovely wife, and my sons Elvis and Edgar. You were deprived of daddy's presence for a full year. Thank you all for endurance with hope.

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ACRONYM AND NOTES

Acronym	Meaning
BMI	Body Mass Index
CASIN	Centre for Applied Studies in International Negotiations
CLUSA	Cooperative League United States of America
DD	Diarrheal Diseases
FA	Food Availability
FaaB	Farming as a Business
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
FGs	Farmer Groups
FGD or FDG	Focus Group Discussion
FNS	Food and Nutrition Security
FS	Food Security
GIEWS	Global Information Early Warning System
HH	Household
IDPs	Internally Displaced Persons
LRA	Lord's Resistance Army
M+F	Male and Female farmers
MT	Metric Tones
MIL	Mukwano Industries Limited
N/A	Not Applicable
NDP	National Development Plan
OPV	Open Pollinated Variety
PO	Producer Organization
SNV	Netherlands Development Organization
UOSPA	Uganda Oil Seeds Processors Association
UN-OCHA	UN Office for the Coordination of Humanitarian Affairs
UNICEF	United Nations Children Emergency Fund
WFP VAM	World Food Program Vulnerability Analysis Matrix
WUR	Wageningen University and Research Center

ABSTRACT

The Mukwano Oil Seed Company is a big player in the oilseed industry in Lango sub region of Uganda. In 2002, Mukwano started a sunflower farming scheme with about 6,000 farmers in the districts of Lira and Apac (sister district to Lira) and rapidly expanded to seven other districts in the region. The company's overall aim was to improve farmers' livelihoods by guaranteeing them a market for sunflower grain so that farmers could increase on their income earning. The company operated under a contract arrangement whereby all interested farmers signed a contract to benefit from subsidized seeds, fertilizers and a guaranteed price offer at harvest. In recent years farmers cried foul over poor returns accruing from sunflower production under the farming scheme. According to a 2010 report, poor returns increased to levels that threatened the household food situation (food insecurity). The outcry was a clear pointer to failed expectations from a liberalized agricultural sector.

In 1992, the government pushed forward its liberalization policy with the aim to reform the agricultural sector, bring better incomes to rural farmers and fundamentally reform the whole economy. It necessitated government and private sectors/NGOs involvement in providing the enabling environment to include better prices for agricultural produce. The perceived impact of the reform from farmers involved in Mukwano sunflower scheme for better incomes seemed a failure. To understand this, this study was conducted recently on the contribution of Mukwano sunflower scheme to contracted small scale farmers' household food availability. Its overall objective was to understand the impact of the Mukwano sunflower scheme on participating farmers' household food availability and provide practical recommendations to address the weaknesses in the scheme. The specific areas in the study was to understand the overall scheme's impact to household food availability, key challenges faced in the scheme, coping strategies, and derive practical recommendations to improve the scheme.

The study was conducted as a survey. Methods used in data collection were: structured interviews, focus group discussions, observations, and case studies. A total of 41 respondents were interviewed using a semi structured questionnaire. Two focus group discussion meetings was held of 7 men and women in each respective gender category. Different methods were used to provide better insights, validate data and make the research results more reliable. The main findings of the study showed that the scheme has positively contributed to household food availability because of the good income it provided to contract farmers. Also as result of participation in the scheme, it has contributed to improved dietary diversity of the participating households; and increased number of meals per day of the households as well. The study identified key constraints to the scheme as noted by farmers as poor germination of sunflower seeds, lack of ox ploughs, and lack of grain drying carpets. For each of the constraints mentioned above, farmers coped by testing the seeds for germination before planting, hiring or borrowing ploughs, and in case of drying sunflower grains, farmers timed their harvest or borrow carpets from others. To improve the situation of the scheme, the study recommended maintaining and strengthening the farmer groups (now called producer organisations), building grain stores, giving loans (revolving or recoverable terms) and improve control over grain buying prices. Overall, the study concluded that the scheme managed by Mukwano company have made positive contributions to the food security situation of the participating households.

Key terms: *Mukwano sunflower scheme, contract farming, small holder farmers, food availability*

CHAPTER ONE: INTRODUCTION

1.1 Background on sunflower farming in Lango

Lango region is found in northern Uganda, consisting of eight districts namely: Lira, Apac, Oyam, Amolatar, Otuke, Alebtong, Dokolo, and Kole. All these districts have roots in sunflower, a widely grown oil crop by small scale farmers for local oil extraction for use in the households and seldom as snacks (to satisfy food nutrition/ utilization dimension of FNS). Currently, Lira district dominates in number of farmers growing sunflower, for example, according to findings from a report by SNV (2009), it indicated that Ogur Sub County alone has 52,200 farmers.

The oil seed industry, according to Kamoga (2011) is considered one of the most vibrant and promising business sectors in Uganda for both local and export markets. And in Lira, there are many private companies promoting oil crops growing (especially sunflower) but largely by Mukwano, UOSPA, and Mt. Meru Oil millers. Their operations varies into small, medium, and large scale, often depending on additional functions in the value chain. According to FAO (2013) report, 80 percent of Uganda's population lives in rural areas and roughly 35 percent of them are unable to meet their basic needs for food, shelter, water, clothing and medication. These rural dwellers practice subsistence farming basically. The promotion of oil seed industry, especially sunflower is seen a cherished hope of the private sectors in reducing poverty and contribute to meeting their basic needs. The interventions would improve the situations by increasing incomes and employment farmers and other actors.

1.2 Mukwano Sunflower scheme/farming in Lira

Mukwano is a private oil Seed Company that is actively engaged mainly in sunflower production in Lira. It perceives northern Uganda to be the best source for raw materials of its oil milling industry. In 2002, the Company started its sunflower growing scheme with about 6,000 farmers in the districts of Lira and Apac (a neighbor district to Lira) and rapidly expanded to seven other districts in the region. The company's overall aim was to improve farmers' livelihoods by guaranteeing them market after production so that farmers realize more income. Currently, it's working with over 50,000 small scale farmers in and around Lira, where their processing plant is located (SNV, 2009). Overall, it has about 70,000 farmers in total in the whole of northern Uganda. The Company plans to scale up its work with 100,000 farmers in the near future. At the moment, the company is expanding its production to include promotion of soybean and maize in its farming initiative. The company also handles agro-processing and value addition for both local and export markets.

Right at the scheme's inception, Company operated under a contract arrangement whereby all interested farmers sign a contract (contract farming). In the contract terms, the company gives subsidized inputs (seeds, fertilizers) and guaranteed price at harvest. This meant that in contrast to other agricultural products where farmers can buy or multiply their seeds elsewhere, here, farmers are under obligation to buy seeds (hybrid 7351) from Mukwano, UOSPA or other seed companies and sell to Mukwano exclusively as raw inputs for edible oil and seedcake processing. The company additionally provide seeds and training to farmers.

At the moment the company has an oil Mill right in Lira that extracts crude oil. Its current target stands at a total out-put of 18 000 tons of oil production per day. It has an input/processing capacity of farmer output of 60 000 tons of produce of hybrid sunflower, thus satisfying 34 percent of Mukwano's total oil demand in the market. The refinery of oil takes place in Kampala. The value-addition and linkages, according to FAO (2013), gives the sector a competitive edge and has boosted growth.

This commercial up scaling of the production was embraced by most small scale farmers. According to Opio (2008) and Odomel, (2008), it increased women's income and by about 30% for the rest of other farmers between the years 2005-2008. These incomes growth, according to FAO (2012), will be most effective in reducing extreme poverty and hunger, because it will be able increase returns to labor and generates employment for the poor. From a food security perspective, besides increased incomes and labor, if the market for a crop that cannot be readily consumed after producing is uncertain after farmers allocate a greater portion of their land to producing it, the situation may lead to food insecurity in households. Farmers' capacity therefore to deal with markets and markets interface (certainty) leads to major productivity increases, for example, an increase in the price of products, farmers will expect more incomes FAO (2012).

The scheme's arrangements have been excellent until about 2009. The year 2010, defined major challenges by farmers in the scheme. According to the SNV (2009) report, it included: wide fluctuations in commodity prices; erratic weather patterns; inadequate quality inputs (seeds); poor input supply systems; limited access to affordable finance; weak producer groups; and poor bulking and post-harvest handling facilities and technologies. These challenges were also confirmed by Johnson *et al.* (2007) and Coulter *et al.* (2005), to include also markets and unsustainable market access systems as main constraints to the sector.

1.3 Problem definition/statement

Sunflower was a traditional crop in most rural households for locally processed cooking oil and seldom, snacks in Lango region. In the year 2003, Mukwano, a private oil Seed Company began a sunflower growing scheme which, according to FAO (2013), was aimed at meeting the food needs of households through the incomes it offers, and also contribute to reducing poverty in the end. Farmers massively joined the scheme since it offered ready market for the produce. However in 2010, majority of farmers expressed discontent on the scheme claiming farming the crop was negatively contributing food security in their household's i.e. leading to low food availability. There is insufficient information to validate the claim.

1.4 Relevance of the study (Justification)

Agriculture is considered a core sector for economic growth, food security, income enhancement, employment and prosperity for socio-economic transformation, with private sector, seen as the engine (NDP, 2010). The country is documented as food self-sufficient except in vegetable oils and cereals (FAO, 2010). To this state, government recognises the contribution of private sector to productive investments to small-scale farming as it underscores its relevance to food security in the households. To contribute to the socio-economic conditions indicated above, Mukwano, as a private investment company initiated a sunflower program in 2003 which rapidly expanded to seven districts in northern Uganda including Lira district. The program was appreciated government due to its poverty reduction potential and ability to transform the lives of about 12 million people by the raising their incomes (SNV, 2009). The aim of improving farmers' livelihoods and purchasing power based on increased income was thus met. This encouraged the Company to invest in the oil seed production by contracting small scale farmers while offering them guaranteed market. Farmers involved appreciated because of the tangible and short time economic benefits it offers.

However, circumstances surrounding this lucrative economic crop, according to FAOSTAT (2011) is declining faster. The decline in production trend was reported to be 220,000MT in 2011 up from 234,000MT in 2009. The trend is worrying and conveys huge implications to food security in households that depend on the proceeds from the crop for food availability/accessibility. Understanding the dynamics involved from a study would be important. The information will be useful in predicting future food security situations of households that continuously rely on the. It

will also set a benchmark for future detailed study that could lead to policy shifts by the implementers (actors) in the scheme.

1.5 Research Objective

To understand the impact of the Mukwano sunflower scheme on participating farmers' household food availability and to provide practical recommendations to address weaknesses in the scheme.

1.6 Main research questions

1. What has been the impact of Mukwano sunflower scheme on contracted small holder farmers in the scheme?
2. What key challenges do the main stakeholders face in the scheme and how do they cope?
3. How can or should the scheme be improved to contribute to food availability for participating small holder farmers.

Sub questions to answer main question 1

1. How has the scheme contributed to food availability?
2. What has been the impact on dietary diversity?
3. What has been the impact on the number of meals per day?

Sub question to answer main question 2

1. What are the challenges faced by small holder farmers and how do they cope?
2. What are the issues faced by the company and what have they done about it?
3. What are the challenges face by the government and what have they done about it?

Sub question to answer main question 3

1. What strategies do stakeholders recommend to improve the scheme?
2. Based on these strategies what are the concrete actions that can be taken to strengthen the scheme?

1.7 Limitations of the study

A number of challenges occurred during the study which were beyond the control of the researcher.

First and foremost, the research was conducted during the onset of the second rains. Farmers had experienced a prolonged dry spell marred with crop failure (especially beans). Most farmers were therefore out in the fields to prepare for second season planting. Therefore, it became challenging to mobilize and for farmers to give their time for being interviewed or to participate in focus group discussions. Interviews would begin from about 2 o'clock in the afternoon to late evening hours.

Secondly, the road conditions were bad and became inaccessible in some areas and prevented the researcher from travelling to the more remote areas.

Finally, it was observed that collecting information from private companies is often viewed with suspicion. Despite a very hospitable, vastly knowledgeable and freely interacting respondent from the Mukwano group of Companies, probing questions was often met with hesitation. With the limited information, it could affect the reliability of the results to some extent.

CHAPTER TWO: CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2.1 Food availability concept

The concept of Food and Nutritional Security (FNS) has evolved considerably over time. In the process, the starting point was food availability to balance unequal food distribution regionally and nationally. However, it was rapidly accepted that availability, though a necessary element, is not sufficient for food security, because food may be physically existent but inaccessible for those most in need. Because accessibility dimension is linked to availability as well, the two terms will be used altogether or interchangeably.

Many authors cited meanings of food availability from different perspectives. According to Weingärtner (2000), availability refers to the physical existence of food, be it from own production or from the markets. Referring to a national level, food availability is a combination of domestic food production, commercial food imports, food aid, and domestic food stocks, as well as the underlying determinants of each of these factors. The term is then used to refer to food supplies available at both the household level and at a more aggregate (regional or national) level. This availability, according to Gross *et al.* (2000), can be influenced by two sensitive factors of fluctuation in food prices and regional food gaps.

Further, Gross *et al.* (2000), classifies availability and access together with utilization and stability elements, to form categorical dimension of FNS, and are relevant to the social organizational levels (indicated in the conceptual framework). The social-organization and administrative levels are classified into three: Micro, Meso, and Macro. The micro levels deals with individuals and household/family members, while Meso and Macro levels encompasses community (district, province or a village), the nation and global level respectively.

Measurement of food availability at macro, meso and micro levels

Food availability is measured at macro, meso, and micro levels as indicated below:

Availability at macro level can be predicted by the precipitation records for future food production, food balance sheets-that provides information on food availability at national level. The WFP's VAM (Vulnerability Analysis Matrix) is also used to analyze the vulnerabilities to food insecurity of target population. A prominent part of VAM is related to food availability. Also it can be done using FAO's Global Information Early Warning System (GIEWS) which collects data related to temporary food insecurity.

At the meso level food availability is predicted through food market surveys, and qualitative food surveys using food focus group discussions, and other information on the accessibility of food for those in greatest need. For quantitative situation analysis, a standardized baseline survey is used.

At the micro level food availability measurements deals with individuals or household members. Agricultural production surveys, and intra-household food frequency interviews are the common methods for availability and accessibility. Whereas anthropometric surveys and immunization in children under five can be used to assess the availability, accessibility, and utilization of food and its stability.

Equally, at micro level, household food security is an important measure of well-being and needs to be considered. Household's inability to obtain access to enough food for an active, healthy life is surely an important component of their poverty. Dietary diversity, which indicates the number of unique foods consumed over a given period of time in a HH, provides an important information on household food security, and has an association between them (dietary diversity and food access) at HH or individual level (Hoddinott *et al.*, 2002).

Further, an important issue to food security at HH, Widome *et al* (2009) indicated that, little is yet known about how food security status may influence family meal frequency. However, meal consumption is important because it has been associated with a higher quality diet. It further indicated that, food-insecure households may eat fewer family meals because of limited or irregular food availability (for those experiencing more severe food security). Additionally, food-insecure households may be generally more stressed and may have family members working hours that interfere with family meal time.

Common indicators of food availability at the different social levels

The table below, indicates that, at micro levels, lack of food storage, and consumption of wild foods are indicators of reduced food availability at the household. Reduced number of meals per day and increased rate of under or unemployment may indicate low food accessibility. Importantly also, changes in pre-harvest food consumption practices, and migration may be sensitive indicators for temporal food insecurity.

Table 1: Indicators of FNS at different social levels

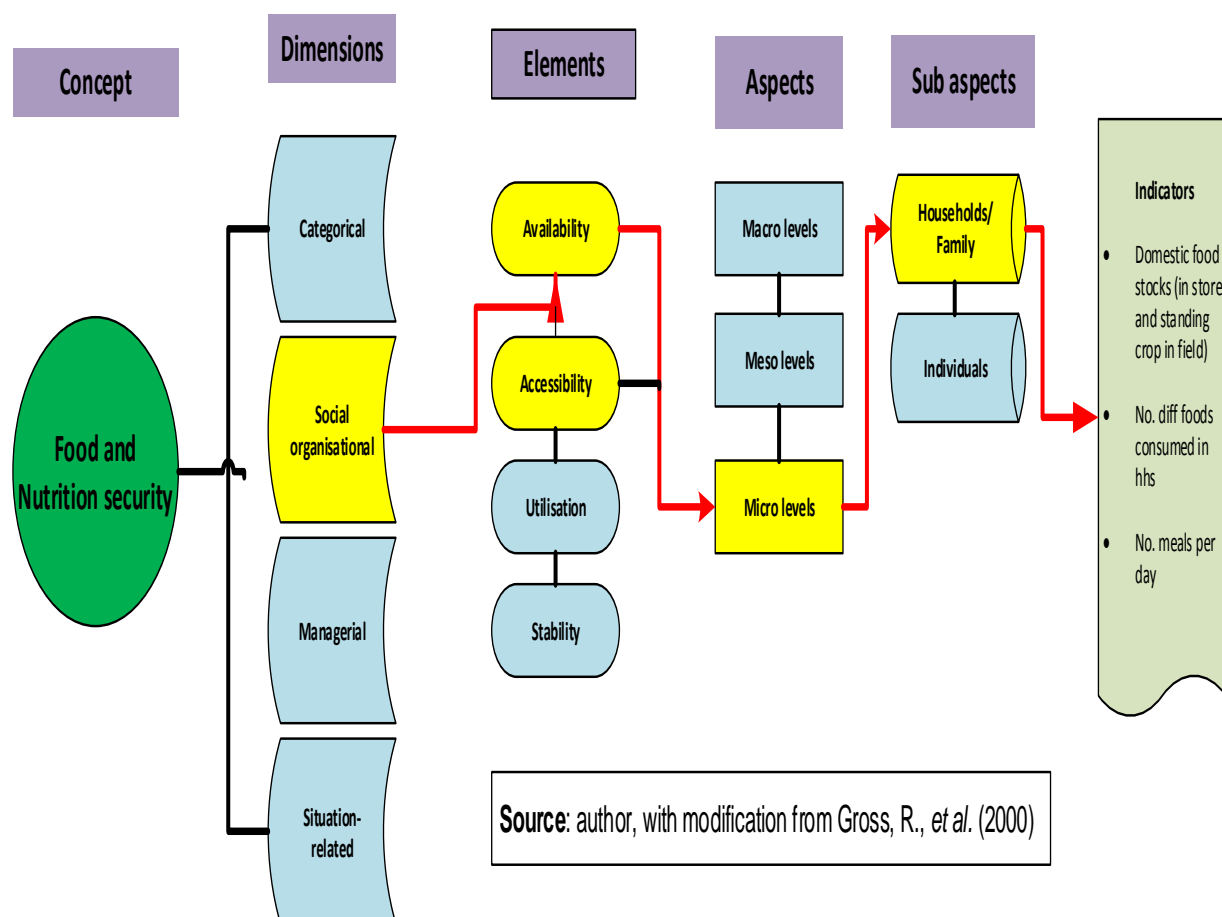
Social level	Availability	Accessibility	Utilization	Stability
Macro	Fertility rate Food production Population flows	Food price Wages Per capita food consumption	Stunting rate Wasting rate LBW rate	Food price fluctuation Regional gaps
Meso	Harvesting time Staple food production	Market and retail food prices	Latrine coverage Diarrheal Diseases (DD) rate	Pre-/post harvest food Women's BMI
Micro	Food storage Consumption of wild foods	Meal frequency Food frequency Employment	Weight-for-age Goiter Anaemia	Pre-harvest food practices migration

Source: Bokeloh *et al* (2005)

2.2: The conceptual framework

The study used the framework of FNS to understand food availability. There are four dimensions namely: categorical, social-organizational, managerial, and situation-related, and three elements that includes availability. The macro, meso and micro level are the main aspects in the framework focuses on households and individuals during analysis.

Figure 1: Operationalizing Food and Nutrition Security concept



2.3 The Food and Nutrition concept (FNS)

The FNS is a concept that has evolved significantly over the last decades in theory and practice. It has a holistic approach that combines food and nutrition, hence “Food and Nutrition security”. As abroad concept, it emphasize various dimensions as being categorical, socio-organizational, and managerial and several aspects that includes availability, accessibility, utilization and stability (FAO 2000).

The categorical elements with the conceptual framework of FNS is influenced by two factors: the physical and temporal factors. Physical determinant relates to the food flow in: availability-accessibility and utilization, whereas temporal factors relies on the stability of the other three aspects. Social organization levels underscores the relevance of availability, access, use, and utilization, and stability to all levels of social and administrative organizations from the individual and the household (micro level) to community (meso level) and the nation and global level (macro level). And in the managerial dimension, the concept studies the managerial aspects of FNS projects and programs in a classical project cycle management, for example, a triple “A” (A-Assessment, A-Analysis, A-Action) format used by UNICEF. In the situation-related dimension,

FS prediction is made through precipitation records, food balance sheets or by use of different analysis tools such as the “VAM” used by WFP.

2.4 The role of private sector/companies in food security

In order to gain basic insights into the study subject, a theoretical and conceptual framework was considered and developed. This was based on reviewing relevant literature regarding the role of private sector/companies in food security, food availability (a dimension of food security concept), and contract farming modalities. It would be important to understand and recognize previous related work by others on the study subject matter so as to be able to provide critical judgments.

Private companies includes those businesses that are engaged in agriculture, food processing, packaging, retail and food service. All have an important role to play. Thinking of their roles in food security intervention, is thinking of steps towards reducing hunger, and more importantly, about poverty. Hunger, according to Londner *et al* (2000) has a number of proximate causes such as poor health, crop failures, lack of nutritional information, conflict, etc. Almost all of these stem from one core issue-poverty. Addressing hunger can be accomplished by reducing poverty, and poverty reduction depends on rapid agricultural-led growth which private sector or companies is expected to be a lead agency to realize the economic growth and hence alleviate the condition in the 21st century.

Harvest, (2012) equally agrees with the statement above in that, enhanced private sector involvement is key to global food security. Their critical role is anticipated in the agricultural development initiatives. The investment initiatives, are proven to have significant returns (Harvest, 2012). The notion may raise the exploitative nature of some corporations though. Private sectors are uniquely seen to help create economic growth to raise global incomes and feed a growing global population estimated to reach 9 billion by 2050

Because private sectors fall under different categories – they include Non-Governmental Organizations (NGOs), community based organizations, donors, civil society organizations, advocacy groups, and food companies. Their direct broad roles to impact food security is in many ways. CASIN (2002) identifies four key roles/areas:

- i) Initiating economic policy reforms in agriculture. Policy dialogues are thought to be politically preferable because they involve less interference and recognize the ability of government to undertake independent action.
- ii) Improving infrastructure, especially transport, storage, and information collection and dissemination. Although infrastructural improvements remains the responsibility of the state, self-help schemes could be sparked by the provision of technical assistance at community levels. Project-based support is still necessary in the area of infrastructure. Improvements in rural roads, new and more reliable sources of energy, and expansion of agricultural extension services are critical for increased agricultural productivity and processing.
- iii) Supporting agricultural marketing channels by strengthening marketing skills, financing, and trainings. Specific attention should be directed at expanding the ability of private traders to handle bulk volumes to promote economies of scale.
- iv) Supporting human capacity development by offering training and technical assistance directed toward building of local capacity.

The increased access to better technologies for farmers such as improved seed varieties, farm machinery, and better agronomy skills enhances output, employment, and increased, steady incomes. The availability of a good and steady supply of seed material ensured continued production of vegetable oil and profits to the business as well as enhances competitiveness of the sunflower sub-sector; thus, standardization of production in terms of quality-produce, value-addition, and processing extension service needs.

2.4 Definition of key words used in the study

i. Mukwano private company

A Privately-owned limited company involved in the development and promotion of oil seeds in Lango region. It is therefore a business entity and an organization not run by the state, but exists for profit making as the main goal with a social responsibility function. It helps the local community to create income generating opportunities, or improve its social relations. Usually, they are representatives of the market for the product they promotes (Willis, 2005).

ii. Sunflower farming scheme

The farming scheme refers to a farming arrangement or an out growers program where according to FAO (2013), the Company provides seeds, advance cash, implements such as tarpaulin, empty bags, and, technical service to farmers and buys the entire crop produced with those materials. Under the scheme, farming households are in the districts of Lira, Otuke, Oyam, Kole, and Alebtong and further spreading elsewhere. Warehouses, an oil mill, and a maize mill are in place in Lira Town for the produce. Mukwano Group of Companies' reason to invest heavily in sunflowers, soybeans, and maize production is that they have an expanding soap industry. Also the expansion of animal feeds and seeds production industry is contributing to their refocus.

iii. Small holder farmers: In the research study, it will mean farmers that own or/and cultivate less than 2.0 hectare of land (FAO, 2002) and their operation needs assistance to significantly increase their productivity (Kirsten *et al*, 2010).

iv. Food Security: according to FAO (2006), FS is achieved when it is ensured that “all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life”

v. Food availability

According to Daryll *et al* (2013), the concept of food involves issues of production and distribution. The availability of food means there is sufficient food – physical availability at the household, community, state or international levels to provide food for everyone. For the majority of the hungry in the world, self-production or production within their community is the primary means of ensuring the physical availability of food for them and their families. For others in the world, availability involves the distribution of food and food products to humanitarian or retail outlets within their community. The availability concept is closely linked to accessibility as well. It therefore includes the physical ability to provide labor needed to farm. For those not engaged in their own food production, accessibility means the ability to earn enough to participate in the retail market for food. Accessibility also can be made available through a form of social security provided by family members for those too old or weak to earn a living or produce their own food. For some, accessibility involves obtaining food from aid agencies.

vi. Contract farming: A system or farming arrangement seen as a partnership between agribusiness and farmers. It means, an agreement between farmers and processing/and or marketing firms for the production and supply of agricultural products under forward agreements, frequently at pre-determined price. The arrangement also invariably involves the purchaser in providing a degree of production support through, for example, supply of inputs and the provision of technical advice. The basis of such arrangement is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and the commitment of the company to support the farmers' production and to purchase the commodity (FAO, 2005).

CHAPTER THREE: RESEARCH STRATEGY AND METHODOLOGY

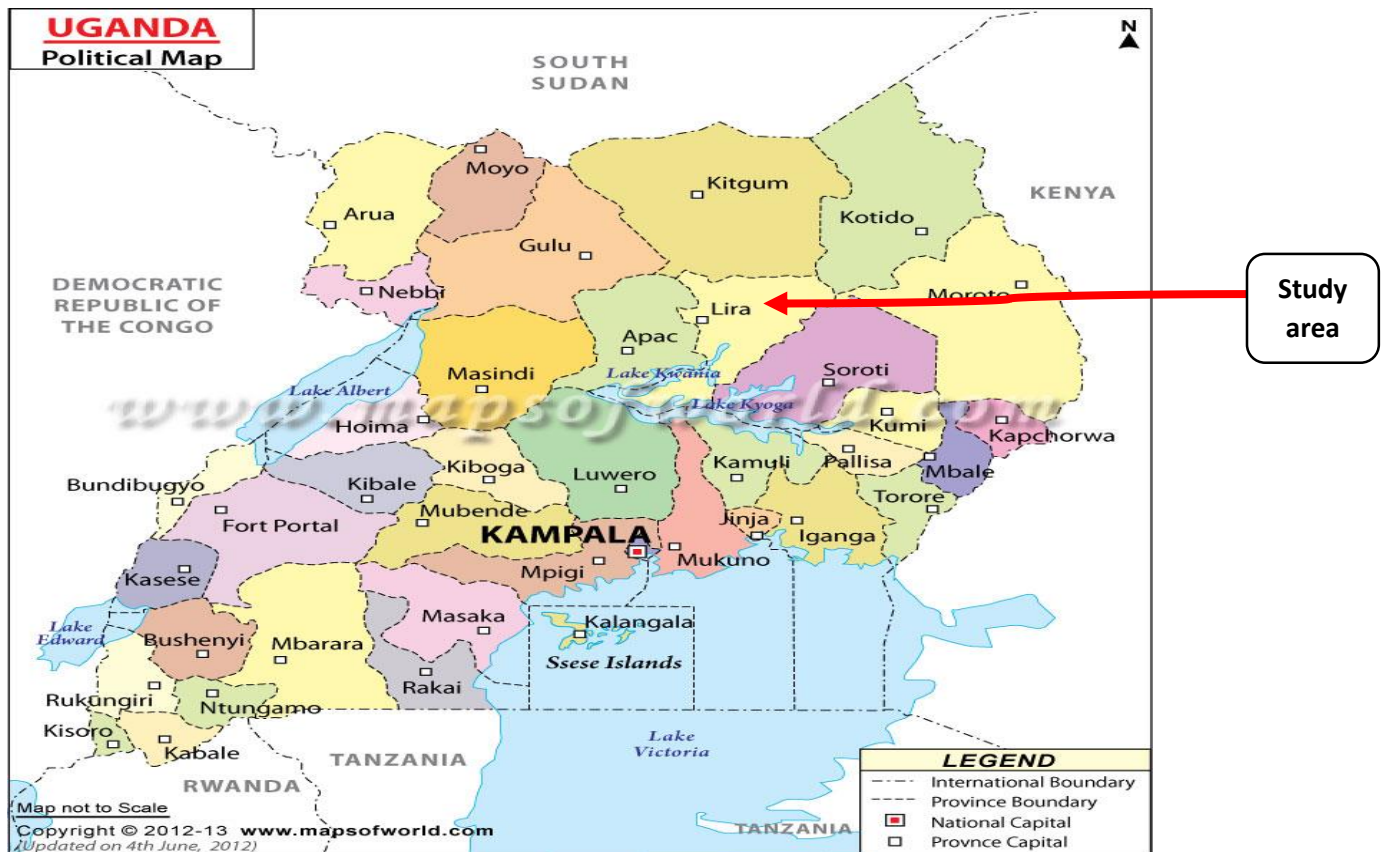
3.1 Research study area

The study was carried out in Lira district but specifically in Ogur Sub County. Lira district, which is located in northern Uganda on the north-eastern shores of Lake Kyoga has predominantly rural population. It is bordered by districts of Pader and Otuke in the North and North East, Alebtong in the East, Dokolo in the South and Apach in the West. Physically, the district lies between: Latitudes 1° 21'N, 2° 42'N Longitudes 32° 51'E, 34° 15'E. the area of the district is estimated at about 7,200 sq.km of which 4620 sq.km is estimated to be arable (Janowski *et al*, 2003). The district of Lira belong to the Lango farming system, which is an agro-pastoral system that is traditionally based on the subsistence production of annual crops and livestock in a mixed farming system (Bagnall-Oakeley *et al*, 2002). It has two distinct rainy seasons. The main rainy season fall in April/June and the second rains in August/October. The average annual rainfall is recorded at about 1400mm (Janowski *et al*, 2003).

The specific study area, Ogur is situated in Erute County. It is located on the Lira-Kitgum road, about 30 km North East of Lira district. It is bordered by Aromo, Okwang, Apala, and Adekokwok sub counties. It is made up of 8 parishes. Adwoa and Orit were the parishes chosen for sampling respondents to the study. The sub county was chosen because, it is one of the oldest sub counties to be involved in Mukwano sunflower scheme in Lira district. The area has highest number of farmers under Mukwano scheme with a fair representation of women in the farmer groups. In the research design, women representation was an essential category in the study. And finally, the sub county has a fairly accessible road network and accommodation facilities convenient for a field work.

The research was conducted from farmers under contract farming of Mukwano sunflower. The organization was chosen because it's an old and main actor in sunflower industry in the region with the largest farmer-base of over 70,000 (SNV, 2009). Recent farmer complaints, which is at the center of the research study were directed at them as problem owners, threatening the survival of the project. So information was gathered from male and female farmers in the scheme and key informants in the company and Lira district local government.

Figure 2: Map of Uganda showing location of the study area (Lira district)



Source: Political map of Uganda (2013)

3.2 Research strategy

The research was conducted as a survey but with a brief case study to give a comprehensive and detailed information on the study. It involved understanding circumstances under study from stakeholders consisting of farmers, and key informants in government and private sector (Mukwano). A case study was included because, according to Yin (2009), and Verschuren *et al* (2010), as a methodology it allows the researcher to gain relevant, extensive and “in-depth” or profound insight into one or several objects or processes that are confined in time and space, which may be with an organization or a company. It was therefore necessary that, a case study approach is included in the research to have a holistic and a meaningful characteristic (s) of the events. The research study gathered mainly qualitative information but will be transformed and reported both as qualitative and quantitative.

3.3 Research methodology, data collection and analysis

Methodologies in the research involved desk study, a survey, Focus group discussion, Researcher’s observation and a case study to obtain both secondary and primary data. Desk study was used to obtain secondary information, whereas a survey, Focus group discussion, Researcher’s observation and a case study were used to gather primary data in the field.

Quantitative assessment and descriptive analysis techniques were used for data analysis. The data from farmer’s interview was analyzed using Microsoft EXCEL. The study used descriptive

statistical methods of frequency and percentage for analyzing the data based on the conceptual framework to answer the main and sub research questions.

3.3.1 Secondary data

The research began with a comprehensive desk study focusing on obtaining as much secondary information as possible before field work. Different literature sources were consulted mainly from WUR library. The literatures were from academic journals and books; on line publications, thesis reports; and other relevant documents to the research context. This enabled the researcher gain a better overview of the subject matter under study and its context. The secondary data gathered was on the role of the private sector (companies) on food security, agricultural sector information on oil crops, food security concepts, definitions of key terms and other concepts to use in the study, information on the study area and participating farmers. The literature study guided the framing and reviewing of research questions, questionnaires, and in preparation of checklists to use in case study and focus group discussion. These literatures cited were referred to when necessary during the discussion and conclusions of results.

3.3.2 Primary data

Primary data was collected in the field. Four methods were basically used. They are: interviews, focus group discussion (FGD), observation (by researcher) and case study. For interviews, a designed questionnaire was used to understand from farmers and stakeholders the impacts, challenges, coping means, and suggested strategies for improvement of the Mukwano sunflower scheme in contribute to improved food security situations of the participating households. The FGD, case study, and field observations were used to validate results from interviews. Researcher's observation was restricted to the environment of the study area and respondent's household food stocks (where applicable - stores and field/standing crop). Availability of photographed food stocks as observed are part of data to base judgments on. Whereas information previously gathered from informal interviews with extension workers, community leaders and other farmers (not in the scheme) was used to refine survey questionnaire.

3.3.3 Sampling of respondents

For this research, purposive and random sampling techniques were used for case study, focus group and survey respondents respectively. The two case study respondents, one male and one female were randomly selected from the total 240 farmers in the parish. Their selection was based on gender, if s/he is still a member of scheme, and if a HH head. For the focus group and survey respondents, gender was a factor considered. The total farmer lists (of 240 members) in the parish was obtained from the Mukwano company site Coordinator and a sample for each category/methodology derived in a random manner.

A total of 36 survey respondents were sampled and three (3) key informants identified, one from Mukwano Company and two from Lira district local government. Of the 36 sampled respondents, eighteen (18) male and 18 female farmers were purposively sampled. All were interviewed using a semi structured questionnaire (see appendix A). Two FGD meetings were held separately. One group for female farmers and another for male farmers. Attendees were men and women not previously interviewed. For FGD, seven members from each category formed the discussion quorum. For field observation, it was conducted concurrently alongside interviews. One male and one female farmer in the scheme, doubling as household heads were consulted in a brief case study.

3.3.4 Ethical consideration during research

In adherence to professionalism while undertaking a research, ethical concerns were observed. During the data collection in the field, ethical principles of voluntary participation, confidentiality, anonymity, right to service and informed consent were observed. As actions on the right to service,

technical questions asked on crops grown were responded to. Also, before every interview, each respondent was explained why, what, how, and for whom the study is being carried out including expectations as a participant. For farmers, the researcher would rely on willing and voluntary consent to be interviewed before conducting the interviews. And with key informants, they would be allowed to read and sign the informed consent form, as a confirmation to willingly participate in the interview exercise.

3.4 Field data presentation and discussion

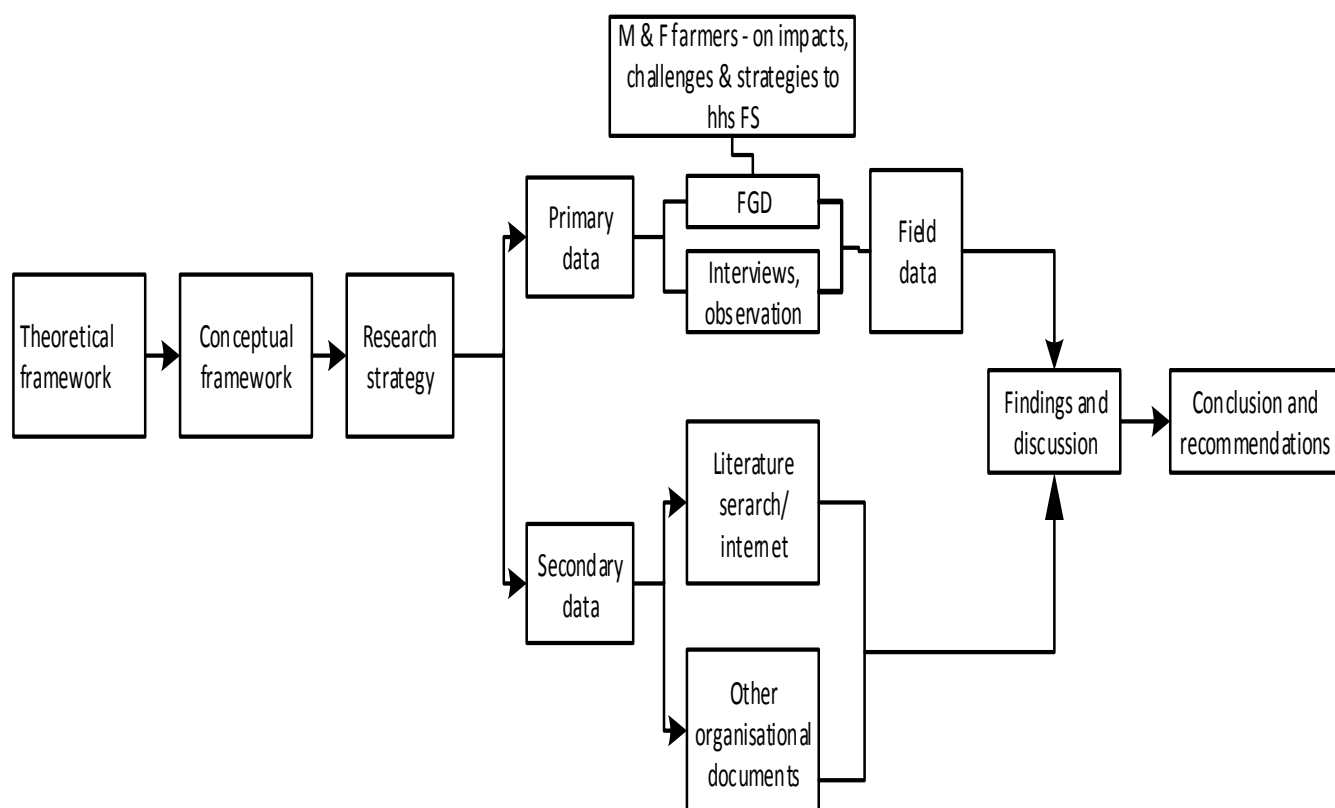
After collection, data was summarized as raw findings then analyzed by the researcher. Presentations were done in line with the main research questions linking up to the achievement of research objectives. The data was then analyzed and discussed per sub question using the Ms. Excel computer program. Analyzed results were presented in tables, graphs, or as charts as appropriate. In some instances, the data are reported descriptively (i.e. as quoted texts). Conclusion (s) and recommendations were then drawn. The data plan and discussion followed is as indicated in the Table 2 below.

Table 2: Data collection process and analysis/presentation

Main questions	Sub questions	Data source	Data to collected	Research tool used	Data reporting
1.6.1	1.6.1.1	Farmers (M+F), and other stakeholders	Impacts on HH FA	Questionnaire	Chart, statement
	1.6.1.2	Farmers (M+F),	Dietary diversity	Q'nnaire/observation	Chart, statements
	1.6.1.3	Farmers (M+F),	No. Meals per day	Questionnaire	Table, statements
1.6.2	1.6.2.1	Farmers (M+F), and other stakeholders	Challenges & coping means	Questionnaire	Graph, tables, statement
1.6.3	1.6.3.1	All Stakeholders	Recommendations	Questionnaire, Focus group discussion, case study	Graphs and Charts

Source: author 2013

Figure 3: The research plan (trajectory)



Source: author 2013

CHAPTER FOUR: RESEARCH FINDINGS

4.1 Background information to the findings

This chapter will present findings as was collected from the field and analyzed. It focuses on the research questions developed in chapter one. A total of thirty six (39) respondents were interviewed. They comprise eighteen (18) female farmers and eighteen (18) male farmers; and two (2) are key informants from the local government, and one (1) from Mukwano company. Two FGD meetings was held but separately. One cluster for female farmers and another for male farmers only. Also two other farmers were chosen as case study respondents, one male and one female. All these methods were meant to validate and make study results more reliable. The farmers are all members of the scheme. The criteria for selecting the farmers was as in the proposal design but in actual sense, as noted from the field, in each producer group/organization, there are more male farmers than female farmers which could tilt the interviewing ratios.

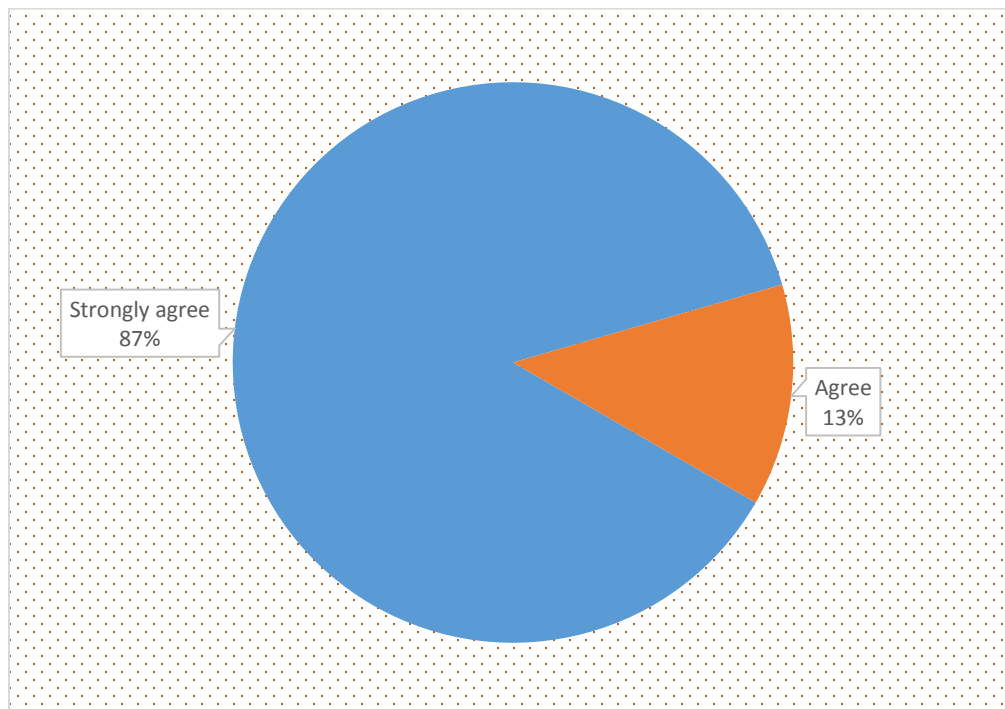
4.2 The impact of sunflower scheme

4.2.1 Background information on the scheme

The scheme began in about 2003 but was heavily affected by the LRA war. It was until 2007 that it started operating again. Currently there are about 900 farmers in Ogur who are engaged in the Mukwano scheme and majority of whom have been for over 4 years now.

4.2.2 Impact of scheme on HH food availability

Figure 4: Farmers response on scheme's contribution to HH food availability



Source: Field data, August 2013

Findings from the survey indicated that, out of a total 39 respondents, 34 mentioned that they strongly agree (87.2%) and 5 out of 39 (12.8%) only agree. Other respondents in the FGD and

case study respondents all strongly agree of the impact of the scheme. Overall, the perceived impact seems positive to food availability in the participating households as one respondent stated: “.....for me I don't worry about food in my house so long as my grain harvest is good and sunshine and rainfall also falls well” case study female respondent remarks.

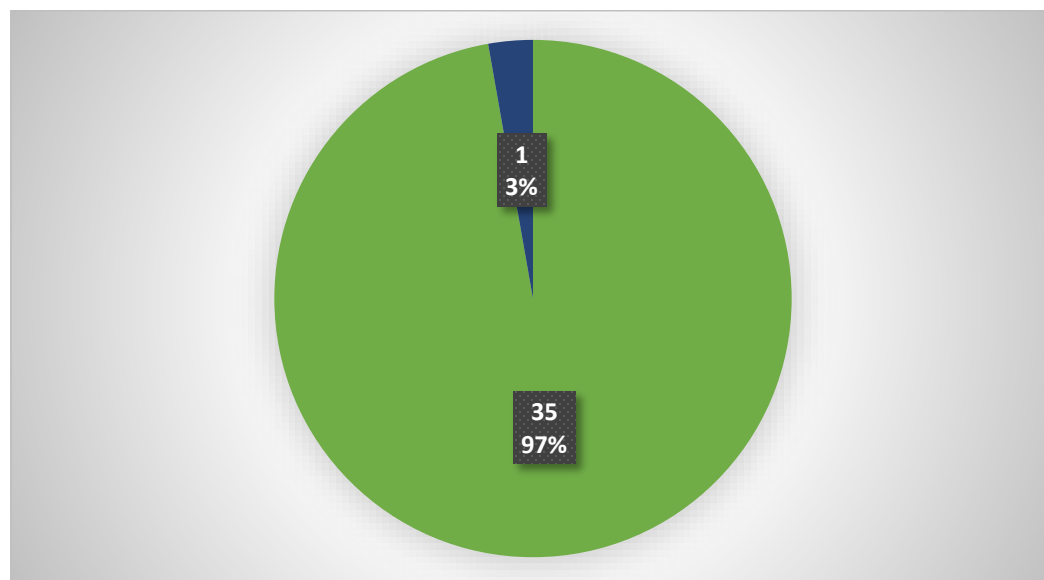
4.2.3 Impact of scheme on dietary diversity

Contract farmers were asked: ‘Because of the Mukwano sunflower scheme, are you able to eat different kinds of foods?’ (See the survey in appendix A) and were given 3 response options: “yes”, “No”, or “I don't know”. The result as shown in the figure 5 below indicated that, out of 36 respondents 35 (97.2%) answered “yes” and only 1(2.8%) respondent out of the 36 answering “No” and with 0 respondent (0%) for answer “I don't know”.

Probing sessions during FGD and case study interviews, all answered “yes”. Overall, the findings seems to indicate that the majority of households experience improved dietary diversity as a result of their participation in the scheme.

“..... for me.....it's meat first when I sell the grains because it's the way my family taste their labor”, exclaims one male respondent during FGD

Figure 5: Farmers response on dietary diversity in HHs



Source: Field data, August 2013

4.2.4 Impact of scheme on the number of meals

During the years 2003-2006, LRA rebels attacked Lira and displaced many people into IDP camps (UN-OCHA, 2004). The IDP camps were created and protected by government forces from rebel attacks. All the respondents interviewed indicated, they were living in the camps and would survive (eat) one meal in a day. The foods were being supplied by aid agencies. It was until 2007 when people began returning voluntarily to their homes and then resettling.

The survey question was asked: “By participating in Mukwano sunflower scheme, has it increased the number of meals for your household?” The response had options either as “yes”, “No” or “I don’t know”. Response with “yes” would indicate increase, and “No” response indicated no increase, while “I don’t know” would indicate that the respondent is not sure.

Table 3: Farmers response when asked on increased number of meals

Response category	Frequency of person	Valid percent
Yes	24	66.7
No	12	33.3
Don't Know	0	0
Total	36	100

Source: Field data, August 2013

The findings to the question therefore indicated that, out of the total 36 respondents, 24 (66.7%) respondents answered “yes”, and 12 (33.3%) respondents stating “No”. There was no respondent with answer “I don’t know” (0%). Findings from the FGD and a female case study respondent all indicated “yes”, with only the male case study respondent answering “No”. The overall findings seems to indicate that, a greater proportion (2/3) of households engaged in the scheme experienced increased number of meals, while about a third have not. This imply, these households eat 3 meals a day and on average 2 times. Households that eat less than 2 times falls in the category of (33.3%) which could be because of poverty or were already eating 2 meals a day on average so no change in the parameter to measure food security.

4.2.5 Overall findings

The research was to measure the impact of the scheme in household food availability, dietary diversity, and number of meals in participating households. The overall findings of the scheme in regard to impacts seems to indicate positive contributions to households. This finding if triangulated with observations made in the field confirms a change in the life of farmers involved in the scheme. It was observed that majority of households can send and retain their children in school, have a budget for family healthcare, and some have constructed permanent houses, besides ensuring food security. To all of these the scheme has made major contributions.

Figure 6: photograph: HH food production/storage (a), (b), and access through market (c)



Source: Field data, August 2013

4.3 Challenges and coping means in the scheme

4.3.1 Background information on the challenges

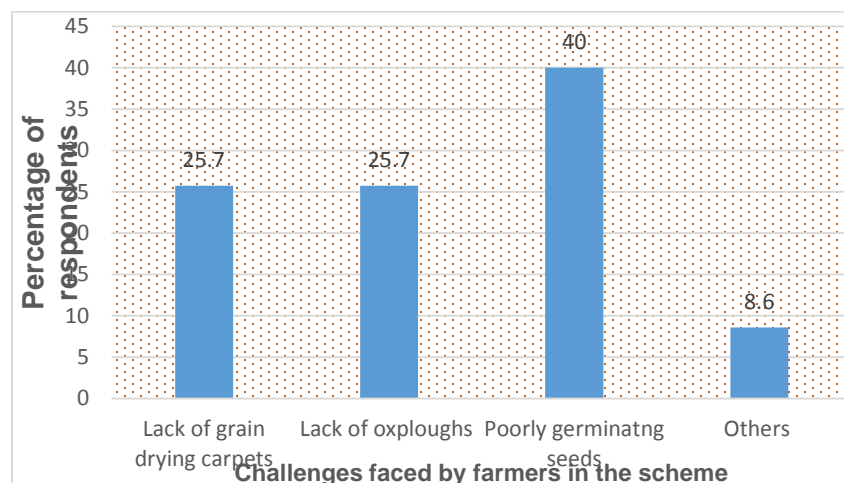
The Mukwano scheme has operated effectively for over 5 years now starting from 2003. The scheme according to Odomel (2008), offered good incomes for farmers up to 2009 with probably better food security status. However in 2010, majority of farmers expressed discontent on the scheme claiming it was negatively contributing to their household food security. A number of challenges could be responsible as pointed in SNV (2009). This section will indicate identified key challenges faced by farmers currently and the different coping strategies being adopted but needs concrete solution.

4.3.2 Key challenges in the scheme

The results of the survey as shown in figure 7 above indicated that all farmers experienced one or more challenge. Out of 35 farmers interviewed, 14 (40%) indicated that poor quality seeds (not germinating) was the key challenge, 9 (25.7%) indicating a lack of ox ploughs, another 9 (25.7%) indicating lack of grain drying carpets, and 3 (8.6%) pointing to “others” with farmers mentioning soil infertility problems, price fluctuations and late planting seeds.

“.....hmmm, it was 2011, I made up my mind to leave the scheme fortunately the last seeds coordinator brought germinated well otherwise you would not get me now ...” one male respondent further remarks during a focus group discussion.

Figure 7: Key challenges faced by farmers in the scheme



Source: Field data, August 2013

4.3.2.1 Coping strategies of farmers

For each of the challenges, a number of coping strategies were identified. This section discusses the coping strategies for each of these four challenges.

Coping from poor germination of seeds when asked on how they cope with the identified challenge(s) in scheme

The coping strategy to this challenge area was based on 14 respondents. The findings indicated that farmers experienced one or more strategies to solve the problem. Out of the 14 respondents interviewed, 8 (58%) cope by sampling and planting few seeds bought first in a portion of field to see if it germinates successfully (a procedure called field germination testing), 3 (21%) seek company replacement, 2 (14%) plant maize immediately as a remedial crop, and 1(7%) do nothing. The results seems to indicate that at least majority of farmers conduct field germination testing of seeds and later depending on the results, others either then seek company's attention for replacement, plant maize or do nothing.

Table 4: Coping strategies in dealing with poor germination of seeds

Challenge area	Strategy	Frequency	Percentage of respondents
Poor germination of sunflower seeds after planting	Field germination testing before planting	8	58
	Seek company replacement	3	21
	Planting maize as remedial crop	2	14
	Do nothing	1	7
Total respondents		14	100

Source: Field data, August 2013

Coping from lack of grain drying carpets when asked, on how they cope with identified challenge(s) in scheme

The survey to the challenge area in table 5 was based on 9 respondents. Out of the 9 respondents, 6 (66.7%) cope by timing their grain harvest, and 3 (33.3%) cope by borrowing or hiring carets. The findings seems to indicate that majority of farmers rely on the weather pattern to determine whether to harvest now or delay a little, with the rest borrowing or hiring. To successfully hire or borrow, it depends a personal relationship with the carpet owner.

“That is my biggest problem....., as a widow, the other rock cemetery (pointing...) is my carpet”, remarks the female case study respondent during the interview.

Table 5: coping strategy from lack of grain drying carpets

Challenge area	Strategy	Frequency	Percentage of respondents
Lack of grain drying carpets	Timing harvest	6	66.7
	Borrowing /hiring	3	33.3
Total respondents		9	100

Source: Field data, August 2013

Coping from lack of ox ploughs when asked, on how do they cope with the identified challenge in the scheme?

In this challenge area (Table 6) below, farmer cope in 3 ways: hiring ox ploughs, reliance on group farming or using the hand hoe. Analysis is based on 9 respondents. Out of the 9 respondents, 6 (67%) cope by hiring ox ploughs, 2 (22%) cope by rely on group farming arrangements involving members in the PO (producer organization) and 1 (11%) cope by using the hand hoes. The findings indicate that many farmers can afford hiring the ox ploughs. A status that can be attributed to the financial strength of households from engaging in the scheme. This is mainly during land opening and second ploughing before planting the seeds.

Table 6: coping strategy from lack of ox ploughs

Challenge area	Strategy	Frequency	Percentage of respondents
Lack of ox ploughs	Hiring	6	67
	Reliance on group farming	2	22
	Using hand hoes	1	11
Total respondents		9	100

Source: Field data, August 2013

Coping strategies from 'other' challenges when asked on how they cope with the identified challenges in the scheme

The survey results to the challenge area (table 7) above indicate a proportionate responses. Out of the total 3 respondents 1(33.3%) does nothing to cope with price fluctuation, 1(33.3%), cope by establishing good relationship with the site coordinator to obtain early planting seeds and another 1(33.3%) cope by planting soya bean crop to solve soil fertility problems believed to be caused by growing sunflower.

Table 7: coping strategy due to 'other' challenges

Challenge area	Strategy	Frequency	Percentage of respondents
Other' challenges	Do nothing (price fluctuation)	1	33.3
	Establishing good relationship with site coordinator (in case of late seeds for planting)	1	33.3
	Planting soya bean after season one harvest (for soil infertility problems)	1	33.3
Total respondents		3	100

Source: Field data, August 2013

4.3.3 Issues faced by Mukwano Company

From Mukwano Company, on the challenges or issues faced in the scheme, they pointed to poor post harvest handling (storage) of grains by farmers and poor road conditions that worsens during rainy seasons and at times make roads inaccessible.

4.3.4 Challenges faced by government

Findings from key informant interview with government staffs (the local government) indicated these as key challenges in the scheme: failure by Mukwano Company to satisfy seeds demand by farmers during time for planting; poor seeds germination; deteriorating soil fertility due to monocropping and continuous cropping of sunflower; and sunflower seeds being expensive for farmers.

4.3.5 Overall findings

The research objective was to understand the different challenges farming households are facing in the scheme and how they are coping. The findings on challenges, seems to indicate that farmers face and cope with different challenges depending on each households situation, however a proportionately higher number of farmers believe that poor germinating seeds is a key challenge and majority cope by testing the seeds for germination first before planting in the main field. Next decision is taken when germination fails and usually follows seeking company replacement or planting remedial crop especially maize.

4.4 Improving the scheme

4.4.1 Background information on improving the scheme

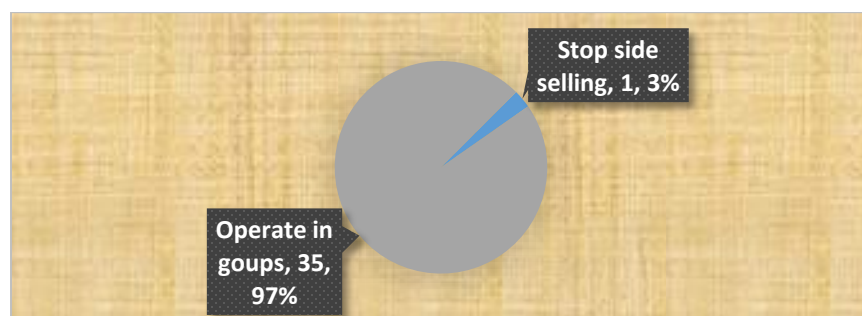
Majority of farmer's recognize the positive contribution of the scheme to their livelihoods over the 5 years. Amongst these were based on the improved financial strength of individual households. Most HHs indicate that now, they are able to send the children to school, meet medical bills, provide foods for their households, and have accumulated household and productive assets. But farmers still face enormous challenges that calls for improvement by key stakeholders. This section below will point out areas recommended for improvement.

4.4.2 Strategies to improve the scheme

Recommendation by farmers to fellow farmers when asked: "What do you suggest to be done by you farmers to improve the scheme?"

Results from the survey (as in figure 8) above was based on 36 respondents. The results shows that 35 (97%) recommended farmers continue operating in groups and 1 (3%) indicating that farmers desist from side selling of grains after harvest.

Figure 8: key recommendation(s) by farmers to improve the scheme

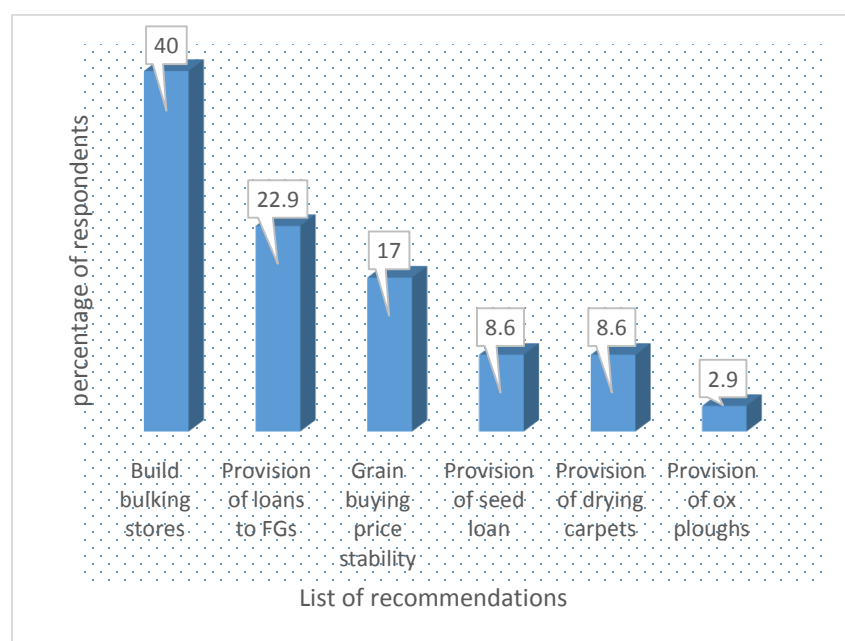


Source: Field data, August 2013

Recommendation by farmers to Mukwano Company when asked: “What do you suggest to be done by Mukwano Company to improve the scheme?”

The results of the survey (as in figure 9) above was based on 36 respondents. Out of 36 respondents, 14 (40%) recommended that Mukwano company build grain bulking stores, 8 (22%) that the company should provide loans to FGs, 6 (17%) stating that the company should stabilize grain buying prices, 3 (8.6%) that the company should provide seed loan, 3 (8.6%) that the company should provide grain drying carpets, and 1(2.9%) that the company should provide ox ploughs to farmers. In FGD, male-only discussion group suggested that, Mukwano Company build grain bulking stores. The stores should be located in parishes, whereas, the female-only discussion group suggested Mukwano Company to stick and honor grain buying prices once announced. With the case study findings, the male respondent suggested that Mukwano Company ensures timely delivery of seed for planting.

Figure 9: Key recommendation(s) for Mukwano Company



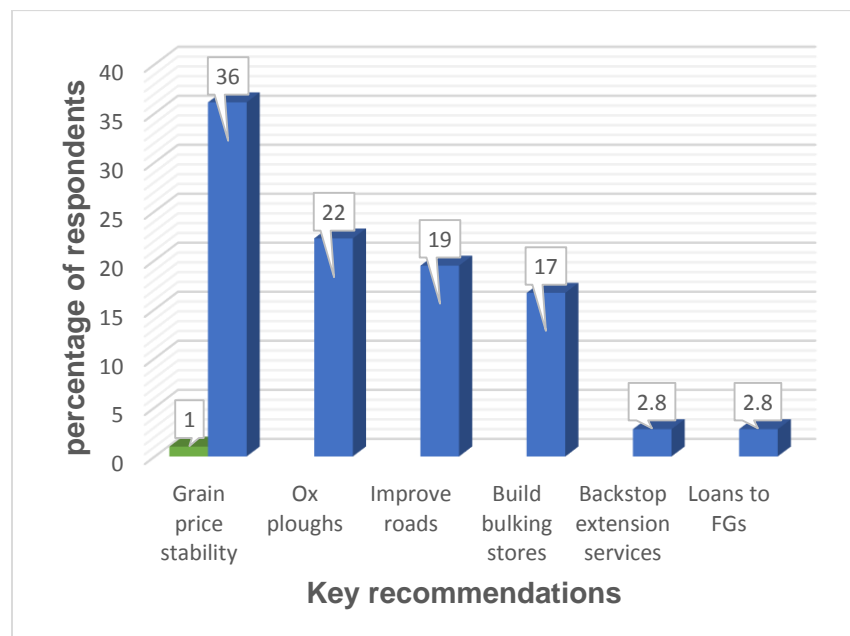
Source: Field data, August 2013

Recommendation by farmers to government when asked: “What do you suggest to be done by government to improve the scheme?”

The result of the survey as shown in figure 10 above is based on 36 respondents. The result shows that farmers prefer government to act in one or more areas. However, out of 36 respondents, 13 (36%) recommended that government acts on stabilizing grain buying prices, 8(22%) that government should provide ox ploughs, 7(19%) preferring that it should improve the road conditions, 6 (17%) that it builds grain bulking stores, 1 (2.8%) that government backstops extension services provided by Mukwano Company and, 1(2.8%) that it (government) provide loans to farmers. In the FGD sessions, male-farmers-only discussion group recommended that government provides farmers with ox ploughs as female-farmers-only discussion group recommends provision of loans to the groups. In the case study findings, the male respondent recommended that, government stabilizes grain buying prices thereby agreeing with findings from the survey. The female respondent recommended government to improve on road conditions so as to improve grain marketing and other agricultural products.

“.....if this road is made good, trucks will pass here and I will not think of Lira produce line again.....”, remarks one female respondent during the interview

Figure 10: key recommendation(s) by government



Source: Field data, August 2013

Findings from key informant interviews on the same from Mukwano company suggested that government should take over and provide extension services; identifies and support operations of local seed companies under a public private partnership arrangement so as to produce viable seeds; and also it (government) should strengthen research into local seeds variety identification, development, and multiplication. Similarly, key informant interview findings from the local government respondents suggested that government updates liberalization policy on prices to have price controls for certain commodities especially grains; improve road infrastructures for commodities marketing ; and construct bulking facilities to help farmers in produce storage

4.4.3 Overall findings

The research study was to obtain recommendations from key stakeholders to improve the scheme. These recommendations are to be practically-oriented strategies that could be adopted by each stakeholder. The findings were segregated per stakeholder. It recommends that farmers continue being in groups but the group needs strengthening and incorporated with savings activity. Majority seems to agree that Mukwano builds stores for bulking grains in nearby parishes, and that government should control the prices of grains as a guaranteed way for farmers to earn better returns from production.

CHAPTER FIVE: DISCUSSION OF RESULTS

This chapter discusses the research findings in light of the literature study. The discussion focuses on the general impact of Mukwano sunflower scheme on participating farmers' household food availability. And also on the impact of the scheme on HH dietary diversity and the number of meals. The challenges of the scheme and coping means are discussed in the light of the literature review; and provides recommendations to improve the scheme.

5.1 Impact of scheme on household food availability

The results of the study as shown in (Figure 4) indicated that, nearly all respondents in various methods used strongly agreed that, the scheme have impacted strongly on the food security situation. This findings implies that the scheme overall have impacted positively to food availability of the participating households. The impact is based on the high incomes got from grain sales. In an acre, the yield of sunflower grain is on average 8-10 50 kilogram bags of grains. Sales price per kg is between 800-900 Ug. Shs. This means farmers can earn between 360,000 - 450,000 Ug shs (€1= 3000 Ug shs) on average per acre per season.

Results from the FGD held separately for male and female farmers of the scheme all confirmed the scheme's strong (positive) contribution to HH food availability. Female farmers FG discussion indicated that earnings from sunflower grain were prioritized for paying school fees for their children and buying food for household consumption. On the other hand, male farmers FG discussion findings pointed to buying food as a priority followed by family healthcare. Both men and women mentioned that if they experienced a food crop failure, then the income from sunflower grain sale is used for buying food crop as a priority. The common food crops bought for household consumption include beans, field peas, and livestock products (as diet).

In a case study (of one widow and widower respondents), findings from them in relation to this objective concurred with other respondents in scheme, of strongly contributing to HH food availability. The widow farmer however ranked buying clothes and then food later respectively as main uses of incomes from sunflower grain sale, whereas the widower farmer, indicated buying food then clothes as his income priorities in spending. The widower farmer's results is consistent with the responses in male farmers FGD.

The research results clearly show that growing sunflower crop increases income of farmers. This finding is in line with findings by (Odomel, 2008; SNV, 2009; Daryll *et al*, 2013; FAO, 2012) who, found that it contributes to economic empowerment. They all found that income from private sector initiatives can improve food availability in HHs and reduce poverty and transform livelihoods. When farmers earns money through such schemes it enables them to buy food in retail markets for their families (Daryll *et al* 2013).

The result contrasts farmer's claim on the scheme to causing food insecurity in HHs. Rather, Gross (2000) indicated price fluctuations as a potential danger to HH food security and especially low prices. This is seen as the basis of the farmer's claim then. It further meant that, farmers were receiving low incomes and was affecting their purchasing power to avail food (through market access) for their households.

5.2 Impact of scheme on household dietary diversity

The research study indicated that majority of households are experiencing improved dietary diversity in foods mainly accessed from the local markets. During the interviews and FDGs, in probing sessions to understand further, most respondents indicated dietary diversity to have increased both during periods of traditional hunger (May-June) locally termed "*odunge*" and normal/lean periods. During the traditional hunger periods however, most households restrict their

diets to mainly cabbages, meat and small fish (the *Haplochromines*) and a few other green leafy vegetables.

These findings are in line with the one by Hoddinott *et al* (2002); who stated that dietary diversity and food access are closely associated. Whenever there is income, access to dietary foods is possible and easy for most HHs. Importantly however, is that, dietary food access is a measure of an intervention impact and food security in the households (Hoddinott *et al*, 2002).

5.3 Impact of scheme on the number of meals in households

Study findings indicate that the majority of respondents experienced an increased number of meals as a result of participating in the scheme. The meal frequencies are mornings, noon (lunch) and evenings (dinner/supper). Probing during the interviews revealed that before joining the scheme (in 2006), majority of the respondents lived in IDP camps and would live one meal a day (and usually in the evenings). However after joining the scheme, the majority of HHs now eat 2-3 times a day (for those in the 67%). Further for the 67% group of respondents, it meant that on average their HHs eat twice a day if morning meal (or breakfast) is excluded from the menu.

The remaining 33% of the households, are either poor to afford 2-3 meals a day or as they joined the scheme, they were already eating 2-3 meals a day. It was interesting also to discover that, most respondents do not consider breakfast as part of a day's meal but rather only lunch and dinner. Overall, the situation has improved as remarks one respondent:

“.....you have come at a better time, life has improved now,.....these days we eat 2 times but 3 if including breakfast”, humorously remarks, one female respondent during a focus group discussion.

This findings, according to Widome *et al* (2009) however, little is yet known about how improved food security status in households may influence the number of meals per day. This means that the increased number of meals in a household may not be independent of one factor but rather on a host of other factors. For this study conditions that point to normality in rural setting – like of relative peace and tranquility, favorable weather are amongst possible contributors cited for the result.

5.4 Key challenges in the scheme

The study identified important challenges in the scheme. The most important of these were: poorly germinating seeds, lack of ox ploughs, lack of grain drying carpets, expensive seeds, lack of grain bulking store, and fluctuating grain prices. These challenges are viewed differently by each stakeholder but this study confirms as was previously identified in other studies by SNV (2009), Johnson *et al* (2007) and Coulter *et al* (2005) as main constraining factors to the sector that needs action urgently. Currently farmers are coping with them as indicated in (Table 4-7)

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study was conducted to research on the impact of Mukwano sunflower scheme on participating farmer's household food availability. The study explored the impacts, challenges, and coping mechanisms in facing these challenges, and derived practical recommendations to address the weaknesses in the scheme. The study findings found that participating in the scheme impacts positively on household food availability, and also in terms of HH dietary diversity and number of meals.

The majority of the interviewed stakeholders (farmers, government representatives, and Mukwano company staffs) as key stakeholders in the study expressed that the impact of the scheme has been positive and resulted in household food availability, dietary diversity and an increase in the number of meals. These positive impacts are attributed to the incomes farmers get from sunflower grain production. The income is prioritized to buying food from the local markets, injected into buying inputs such as seeds, hoes, and fertilizers for domestic food production or other pressing HH needs. The choice to do this depends on seasonal crop failure.

The study found out that before 2007, majority of farmers in the area then lived in IDP camps and ate one meal a day. Findings from the study indicated an increase in number of meals per day and concluded that majority of households have meal frequencies ranging from 2-3 times a day.

The study indicated that the challenges faced in scheme are many and viewed differently by each stakeholder. For farmers, poorly germinating seed is the main challenge (as indicated in figure 7) and yet the seeds are expensive. At the moment, it's costing 16,500 Ug shs per kg (€ 1 = 3000 Ug shs). If the challenge continues unsolved, farmers believe is poised to make them poorer. For government, it indicated failure by Mukwano company to satisfy farmers seeds demand, and whereas Mukwano Company pointed to poor post harvest handling (storage) of grains. The research study concluded that the three key challenges pointed by stakeholders are poorly germinating seeds, unsatisfied seed demand by farmers, and poor post harvest storage of grains.

With regard to coping strategies, the key challenge of poor seed quality, study concluded that majority of farmers cope by testing the seeds for germination in their fields first, after which, some then seek company assistance for new seeds (by replacement), or plant maize as an alternative crop.

The study concludes that building a bulking store; undertaking actions that ensures grain price stability; and continued operation of farmers under groups or current producer organization is best for sustainability of the scheme.

Overall the study finds that the scheme has positively contributed to households' food situation. This finding, when compared with observations by the researcher in the field confirms the change in the lives of farmers involved in the scheme. Farmers are able to send and retain their children in school, have budget for family healthcare, and some have constructed permanent houses, besides ensuring food security. The study recommends progress of the scheme will rely on the commitment of concerned stakeholders in constructing grain bulking stores, stabilizing grain prices, and supporting farmers while they operate in groups.

6.2 Recommendations (concrete actions) to improve the scheme

When Mukwano diversified its business interests in the year 2000 to cover agriculture, it invested heavily in the production of sunflower and soya bean. The investment was meant to provide a livelihood and an income source to farmers through a steady and reliable market for their produce. It was also a strategy towards post war agricultural recovery from LRA conflict. However, based on the research findings of this study, a number of concrete recommendations are proposed to address the challenges/ weaknesses in the scheme. The effort is to ensure sustainability of the project and livelihood of the stakeholders. The recommendation is a practically-oriented strategy that should be adopted by each key stakeholder (farmers, Mukwano Company and government) as indicated below:

1. The study recommends that farmers should continue operating in groups. The group approach, majority of study respondents indicate many benefits that accrue from it like training opportunities, savings schemes, power to voice (negotiation) on price changes, group farming (labor exchange), and other social safety network services. It is also recommended that farmers should consider balancing their land allocation to producing food crops and cash crops (such as sunflower) in order to improve their household food security. Farmers should embrace and adopt new farming technologies introduced.
2. The study recommends that Mukwano Company should build grain bulking stores for farmers. These stores should be located in parishes or parishes close to each other so as to help farmers with storage in an effort to improve grain quality after harvest. The company should honor announced buying prices at the beginning of the season and in instances of price fluctuation dictated by world or a country's economic situation at a given time, prices should be maintained close to that earlier announced.
3. Lastly, the study recommends that Government should regain its mandate of price control over grains to a certain extent much as the economy is under liberalization policy. There is need for a policy update on commodity pricing so that farmers can be protected from falling prices. Price stability is an important stimulant/incentive in agricultural production for small holder farmers. From a food security perspective, it is an assured means to food availability in the households in instances of food crops failure.

Additionally, government should support local seed companies under a public private partnership arrangement to produce viable seeds. These seeds companies could be supported in identification, development/production and multiplication of viable sunflower seeds that can be affordable (fairly cheap) for farmers. This arrangement is expected to provide a relief to farmers from the current expensively imported sunflower hybrid (Pan 7033, Pan 7351) seeds from South Africa.

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APPENDIXES

Appendix A: Semi structured questions used for farmers

I am a student of RD & Food security from VHL University in The Netherlands. I work with Lira DLG before. I am conducting a research to understand “the contribution of Mukwano sunflower scheme to food availability of the participating households”. The information you provide will strictly be used for this study. Thank you.

Basic information, bio data of respondents and Scheme related questions

1. Questionnaire Number, date, Name of respondent, Sex, Age Household type, Household size, Village, Parish, Name of FG
2. How many years have you been in Mukwano sunflower scheme now? [tick appropriately]
3. How much land on average do you dedicate to growing sunflower seasonally? [tick appropriately]
4. How much land on average do you dedicate to growing other food crops seasonally? [tick appropriately]
5. What 4 major food crops do you grow seasonally for your household?
6. For what one main reason do you grow sunflower? [tick appropriately]
7. In the commercial sunflower production, the assumption is that by growing it, you raise income for which you can buy food. Yes, No, or don't know? [tick appropriately]
8. Do you agree with the following statement: Mukwano sunflower project has contributed to my household food availability? Strongly agree, agree, neutral, disagree, strongly disagree [tick appropriately]
9. If agree, strongly agree, disagree or strongly disagree [give one reason for your argument]
10. Because of the Mukwano sunflower scheme, are you able to eat different kinds of foods? Yes, No, Don't know [tick appropriately]
11. If yes give one reason, and if no give one reason
12. By participating in Mukwano sunflower scheme, has it increased the number of meals for my household? Yes, no don't know [tick appropriately]
13. Which year did your household benefitted most from the Mukwano sunflower scheme starting from 2007? [mention]
14. What was the main one reason for this responsible for this benefit? [mention]
15. What one main challenge do you face in Mukwano sunflower scheme?
16. Does the challenge affect food situation in your household? Yes, No, don't know [tick appropriately]
17. How do you cope with the challenge you face in the scheme?
18. If yes, for what one main reason
19. What do you suggest to be done by farmers, Mukwano Company and government to improve the scheme?
20. I have asked you many questions since we started, do you have any question for me?

Appendix B: Semi structured questions for key informant - Local Government

Basic information, bio data of respondents and Scheme related questions

1. Questionnaire Number, date, Name of respondent, Sex, position in the organization
2. In what way (s) does the local government (production/crop sector) relates with Mukwano oil Seed Company?
3. To what extent do you agree with the following statement: Mukwano sunflower project has made an important contribution to the people of Lango? Strongly agree, agree, neutral, disagree, strongly disagree [tick appropriately]
4. If agree, strongly agree, disagree or strongly disagree [give one reason responsible for this]
5. Do you agree with the following statement: By involvement in Mukwano sunflower scheme has contributed to household food security? Strongly agree, agree, neutral, disagree, strongly disagree [tick appropriately]
6. For what one main reason if strongly agree, agree, neutral, disagree, and strongly disagree? [tick appropriately]
7. To what level do you rank the contribution of Mukwano scheme to household food security? Very positive, positive, neutral, negative, very negative[tick appropriately]
8. In your opinion, what key challenges is facing Mukwano sunflower scheme?
9. And what key challenges is facing the farmers in regard to Mukwano sunflower scheme
10. Does the identified challenges affect food situation in household? Yes, No, don't know [tick appropriately]
11. How do you think they (farmers) cope with the indicated challenge(s)?
12. What do you suggest to be done by farmers, Mukwano Company and government to improve the scheme?

Appendix C: Semi structured questions used for key informant - Mukwano Company

Basic information, bio data of respondents and Scheme related questions

1. Questionnaire Number, date, Name of respondent, Sex, position in the organization
2. When did Mukwano begin its sunflower scheme in Lira?
3. Why did Mukwano begin the sunflower scheme and what was its expectation?
4. Which year did Mukwano effectively start the sunflower scheme in Ogur sub county?
5. Considering the total land available per household, how much land on average do you recommend farmers to grow sunflower seasonally?
6. What are your main goals of promoting sunflower growing?
7. What do you consider as your strengths in the sunflower scheme?
8. What do you consider as the challenges/weaknesses in the scheme currently?
9. What key challenges are you facing with farmers in the scheme now?
10. Does the identified challenges affect food situation in households? Yes, No, don't know [tick appropriately]
11. Does the identified challenges affect Mukwano's services with farmers? Yes, No, don't know [tick appropriately]
12. How do you cope with the indicated challenge(s)?
13. Do you agree with the following statement: Mukwano sunflower scheme has contributed to household food security? I Strongly agree, agree, neutral, disagree, strongly disagree [tick appropriately]
14. If agree, strongly agree, disagree or strongly disagree [give one reason for your argument]
15. What do you suggest to be done by farmers and government to improve the scheme?

Appendix D: Informed consent form

The purpose of this form is to seek for your participation in the research study. The research theme is to “understand the contribution of Mukwano sunflower scheme to household food security of the participating household’s”. The research also seeks to derive practical recommendations for adoption by actors involved in the sunflower industry in Lira and Lango region in general. In observance of an ethical code of conduct while undertaking a research, the survey will therefore be conducted under the conditions that:

- You are willing to participate voluntarily in the interview
- Interview to be interactive and to last not more than 20mins of your time
- Your responses will represent the organisation/ agency you work for.
- Confidentiality, privacy and right to service as key principles in social research will be observed
- The findings of the study will comprise recommendations that in the end will be shared with the Company (Mukwano) in helping them improve further its business relations with the farmers.
- In case of any question or need for clarification, you can kindly contact the researcher on:

Tel: +31686003862 (in Netherlands), or +256772871650 (in Uganda) Email: emmanuel.ogwal@wur.nl, or emmafras22000@yahoo.ca

Appending your signature will imply that you have read above and agreed to the conditions or principles provided. You may withdraw at any time if you feel uncomfortable with questions. However the answers provided up to that point will be part of this study.

Signature of respondent

Date.....

Appendix E: List of stakeholders interviewed

No.	Name of respondent	Gender (sex)	Organization	Name of FG	Village	Parish
1	Abeja Florence	Female	Mukwano	Pur ber	Apurimon	Adwoa
2	Keren Ojede	Female	Mukwano	Pur ber	Awanyarom	Adwoa
3	Lilly Ojede	Female	Mukwano	Wot ilwak	Apurimon	Adwoa
4	Awino Josephine	Female	Mukwano	Ceng otima	Apurimon	Adwoa
5	Sylvia Obot	Female	Mukwano	Pur ber	Wigot 'A'	Orit
6	Atum marako	Male	Mukwano	Pur ber	Apurimon	Adwoa
7	Albina Omara	Female	Mukwano	Pur ber	Apurimon	Adwoa
8	Santa Akullu	Female	Mukwano	Ceng oyelowa	Awanyarom	Adwoa
9	Katherine David	Female	Mukwano	Ceng otima	Awanyarom	Adwoa
10	Atworu Janet	Female	Mukwano	Ceng oyelowa	Apurimon	Adwoa
11	Akello sarah	Female	Mukwano	Ceng otima	Apurimon	Adwoa
12	Odyeny Terence	Male	Mukwano	Ceng oyelowa	Wigot 'A'	Adwoa
13	Ellen Abila	Female	Mukwano	Ceng oyelowa	Apurimon	Adwoa
14	Ojok Vicent	Male	Mukwano	Orib cingwa	Apurimon	Adwoa
15	Abura Severino	Male	Mukwano	Orib cingwa	Wigot 'A'	Adwoa
16	Ogwal Augustino	Male	Mukwano	Orib cingwa	Wigot 'A'	Orit
17	Rose Acen	Female	Mukwano	Wot abongonyeko	Awanyarom	Orit
18	Ogwang Ben	Male	Mukwano	Orib cingwa	Apurimon	Adwoa
19	Okabo Sylvesto	Male	Mukwano	Orib cingwa	Awanyarom	Adwoa
20	Grace Okello	Female	Mukwano	Oribcingwa	Apurimon	Adwoa
21	Siddy Okello	Female	Mukwano	Orib cingwa	Apurimon	Adwoa
22	Abila Patrick	Male	Mukwano	Can opwonya	Awanyarom	Adwoa
23	Sophia Angom	Female	Mukwano	Bedi merino mot	Tekulu	Adwoa
24	Awil Peter	Male	Mukwano	Bedi merino mot	Tekulu	Adwoa
25	Opio Alex	Male	Mukwano	Bedi merino mot	Tekulu	Adwoa
26	Acanga Alfred	Male	Mukwano	Bedi merino mot	Tekulu	Adwoa
27	Onyona CP	Male	Mukwano	Can opwonya	Awanya rom	Adwoa
28	Jennifer Ojede	Female	Mukwano	Bedimeri no mot	Adwoa	Adwoa
29	Ongom Morris	Male	Mukwano	Bargweng 'B'	Apurimon	Adwoa
30	Awio Peter	Male	Mukwano	Bargweng 'A'	Apurimon	Adwoa
31	Aceng santa	Female	Mukwano	Bargweng 'A'	Apurimon	Adwoa
32	Abila Polycarp	Male	Mukwano	Bargweng 'A'	Apurimon	Adwoa
33	Ewai Martin	Male	Mukwano	Bargweng 'A'	Apurimon	Adwoa
34	Ojok P'Leo	Male	Mukwano	Bargweng 'B'	Apurimon	Adwoa
35	Okello Ayo M	Male	Mukwano	Bargweng 'B'	Apurimon	Adwoa
36	Adlin Ojok	Female	Mukwano	Pur ber	Apurimon	Orit
37	Ajungu Peter	Male	LDLG	N/A	N/A	N/A
38	Odongo Kizito	Male	LDLG	N/A	N/A	N/A
39	Adwek Robert	Male	Mukwano Co.	N/A	N/A	N/A

Appendix F: Raw data for analysis 1- general information relevant to scheme's study

Respondents	Sex	How many years have you been in Mukwano sunflower scheme	How much land from total land do you dedicate to growing sunflower seasonally?	How much land from total land do you grow food crops seasonally? (acres)	What 4 Major food crops do you grow seasonally?	For what main reason (s) do you grow Sunflower?
01	F	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Cassava, millet, potatoes, maize	For income
02	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Cassava, peas, Beans, greengrams	For income
03	F	4	Over $\frac{3}{4}$	On rented land	Soybean, Beans, maize, cassava	For income
04	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Beans, Peas, Simsim, cassava	For income
05	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Soybean, maize, Beans, Millet	For income
06	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Cassava, Beans, Peas, millet	For income
07	M	3	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Beans, maize, cassava, Potatoes	For income
08	F	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Cassava, Beans, peas, simsim	For income
09	F	1	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Millet, cassava, Beans, G/nuts	For income
10	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Cassava, Beans, simsim, peas	For income
11	F	3	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Peas, Beans, maize, Cassava	For income
12	F	4	Over $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Cassava, Beans, Peas, simsim	For income
13	M	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Cassava, Peas, Beans, maize	For income
14	F	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Beans, Peas, Maize, Cassava	For income
15	M	4	Less than $\frac{1}{4}$	Over $\frac{3}{4}$	Cassava, Beans, Peas, simsim	For income
16	M	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Cassava, Beans, G/nuts, Simsim	For income
17	M	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Less than $\frac{1}{4}$	Beans, Cassava, Peas, maize	For income
18	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Beans, Maze, Peas, Millet	For income
19	M	4	Over $\frac{3}{4}$	Less than $\frac{1}{4}$	Beans, Peas, Maize, simsim	For income
20	M	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Beans, Peas, Maize, Soybean	For income
21	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Beans, Peas, soya bean, Cassava	For income
22	F	3	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Beans, Peas, Simsim, Cassava	For income
23	M	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Over $\frac{3}{4}$	Cassava, Beans, Millet, soya bean	For income
24	F	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Beans, Peas, Cassava, potatoes	For income
25	M	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Beans, Peas, cassava, Millet	For income
26	M	4	Less than $\frac{1}{4}$	Over $\frac{3}{4}$	Maize, Millet, Beans, Cassava	For income
27	M	4	Between $\frac{1}{4}$ - $\frac{1}{2}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Cassava, Beans, Peas, Millet	For income
28	M	3	Less than $\frac{1}{4}$	Over $\frac{3}{4}$	Peas, Beans, Cassava, simsim	For income
29	F	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Less than $\frac{1}{4}$	Peas, Beans, Cassava, Millet	For income
30	M	3	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Cassava, Maize, Peas, simsim	For income
31	M	3	Between $\frac{1}{2}$ - $\frac{3}{4}$	Between $\frac{1}{4}$ - $\frac{1}{2}$	Peas, Beans, simsim, millet	For income
32	F	4	Over $\frac{3}{4}$	Less than $\frac{1}{4}$	Peas, Cassava, Beans, G/nuts	For income
33	M	4	Less than $\frac{1}{4}$	Between $\frac{1}{2}$ - $\frac{3}{4}$	Peas, Cassava, Maize, Beans	For income
34	M	3	Less than $\frac{1}{4}$	Over $\frac{3}{4}$	Beans, Peas, cassava, Millet	For income
35	M	4	Between $\frac{1}{2}$ - $\frac{3}{4}$	Less than $\frac{1}{4}$	Peas, Beans, Maize, Cassava	For income
36	M	2	Over $\frac{3}{4}$	Less than $\frac{1}{4}$	Beans, Cassava, Millet, Peas	For income

Source: Field data, August 2013

Appendix G: Raw data for analysis 2 – impact of scheme

Respondents	Sex	The income earned from commercial sunflower sales is also used for buying food. Yes or No?	Mukwano project has contributed to my HH food security. Do you agree or disagree with the statement?	State one main reason for agreeing or disagreeing in Mukwano sunflower scheme contribution to HH food security?	Participation in farming Mukwano sunflower has enabled us to eat variety foods in the HHs. Yes or No?	What one main reason is responsible for accessing variety of foods in the HHs?	Participation in farming Mukwano sunflower has increased HHs number of meals in a day. Yes or No?
01	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
02	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
03	F	Yes	Strongly agree	High incomes	Yes	High incomes	No
04	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
05	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
06	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
07	M	Yes	Strongly agree	High incomes	Yes	High incomes	No
08	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
09	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
10	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
11	F	Yes	Strongly agree	High incomes	Yes	High incomes	No
12	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
13	M	Yes	Agree	High incomes	Yes	High incomes	No
14	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
15	M	Yes	Strongly agree	High incomes	Yes	High incomes	No
16	M	No	Strongly agree	High incomes	Yes	High incomes	Yes
17	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
18	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
19	M	Yes	Strongly agree	High incomes	Yes	High incomes	No
20	M	No	Agree	High incomes	Yes	High incomes	No
21	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
22	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
23	M	Yes	Agree	High incomes	No	High incomes	Yes
24	F	Yes	Strongly agree	High incomes	Yes	High incomes	No
25	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
26	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
27	M	Yes	Strongly agree	High incomes	Yes	High incomes	No
28	M	Yes	Strongly agree	High incomes	Yes	High incomes	No
29	F	Yes	Strongly agree	High incomes	Yes	High incomes	No
30	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
31	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
32	F	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
33	M	Yes	Strongly agree	High incomes	Yes	High incomes	No
34	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
35	M	Yes	Strongly agree	High incomes	Yes	High incomes	Yes
36	M	No	Strongly agree	High incomes	Yes	High incomes	Yes
37	M	N/A	Agree	High incomes, cooking oil for food	N/A	N/A	N/A
38	M	N/A	Agree	High incomes, cooking oil for food	N/A	N/A	N/A
39	M	N/A	Strongly agree	High incomes	N/A	N/A	N/A

Source: Field data, August 2013

Appendix H: Raw data for analysis 3 – challenges and coping strategy

Respondents	Sex	What one main challenge do you face in the Mukwano sunflower project?	Does the challenges mentioned affect food situation in your HHs?	In what ways does the challenges affect food situation in your HHs?	How do you cope with the challenges in the scheme?	Did you or any member of your HHs one time considered leaving the scheme?	For what reason (s) did you or any of your family member considered leaving or not leaving the scheme?
01	F	Lack of grain drying carpets	Yes	Poor grain quality offering low income	Timing grain harvest	No	Offers good income
02	F	Lack of grain drying carpets	Yes	Grain molding leading to low income	Timing grain harvest	No	Offers good income
03	F	Lack of grain drying carpets	Yes	Grain molding leading to low income	Borrowing from friends	No	Offers good income
04	F	Price fluctuations	Yes	Payment to hired labor in food production	Do nothing	No	Offers good income
05	F	Lack of ox ploughs	Yes	Opening land delays	Hiring ploughs	No	Offers good income
06	F	Poor germination of seeds	Yes	Poor harvests, low income	Test planting	No	Offers good income
07	M	Poor germination of seeds	Yes	Poor harvests, low income	Test planting	No	Offers good income
08	F	Lack of ox ploughs	Yes	Opening land delays	Hiring ploughs	No	Offers good income
09	F	Poor germination of seeds	Yes	Poor harvests, low income	Test planting	No	Offers good income
10	F	Poor germination of seeds	Yes	Poor harvests, low income, limited asset for HH	Seek for company replacement	No	Offers good income
11	F	Lack of ox ploughs	Yes	Opening land delays, faster weed infestation with hand hoes	Hiring ox ploughs	No	Offers good income
12	F	Lack of grain drying carpets	No	Grain molding leading to low income	Borrow from friends	No	Offers good income
13	M	Poor germination of seeds	Yes	Poor harvests, low income, limited asset acquisition in the HH	Test planting	Yes	Expensive seeds, low price offer after harvest
14	F	Lack of ox ploughs	Yes	Opening land delays	Hiring ox ploughs	No	Offers good income
15	M	Poor germination of seeds	Yes	Poor harvests, low income in the HH	Do nothing	Yes	Germination failure of seeds and yet is bought expensively
16	M	Lack of ox ploughs	Yes	Opening land delays	Hiring ox ploughs	No	Source of good income
17	M	Poor germination of seeds	Yes	Poor harvests, low income in the HH	Seek company replacement	No	Source of good income

18	F	Lack of grain drying carpets	Yes	Grain molding leading to low quality and low income	Timed harvest	No	Offers good income
19	M	Late seeds for planting	No	Germination failure, poor harvests, low income	Relating well with site coordinator that at times offers seeds on credits	No	Offers good income
20	M	Poor germination of seeds	Yes	Poor harvests, low income in the HH	Seek for company replacement	No	Offers good income
21	F	Lack of ox ploughs	Yes	Opening land delays	Hiring ox ploughs	No	Offers good income
22	F	Lack of grain drying carpets	Yes	Grain molding leading to low quality and low income	Timed harvest	No	Offers good income
23	M	Soil infertility	Yes	Low yields, poor income	Plant soya bean after first rains harvest	Yes	Low price offer after harvest
24	F	Lack of ox ploughs	Yes	Opening land delays, untimely field operations	Group farming	No	Offers good income
25	M	Poor germination of seeds	Yes	Poor harvests, low income in the HH	Test planting	No	Offers good income
26	M	Lack of ox ploughs	Yes	Opening land delays, untimely field operations	Group farming	No	Offers good income
27	M	Poor germination of seeds	Yes	Germination failure, Poor harvests and low income in the HH	Test planting	Yes	Germination failure of seeds and yet is bought expensively
28	M	Poor germination of seeds	Yes	Germination failure, Poor harvests and low income in the HH	Seek for company replacement	Yes	Low price offer after harvest
29	F	Poor germination of seeds	Yes	Germination failure, Poor harvests and low income in the HH	Test planting	No	Offers good income
30	M	Poor germination of seeds	Yes	Germination failure, Poor harvests and low income in the HH	Maize remedial cropping	No	Offers good income
31	M	Lack of grain drying carpets	No	Grain molding leading to low quality and low income	Timed harvest	No	Offers good income
32	F	Lack of grain drying carpets	Yes	Grain molding leading to low quality and low income	Borrowing/hiring carpets from friends	No	Offers good income
33	M	Lack of ox ploughs	Yes	Opening land delays, untimely field operations	Traditional hand hoes	Yes	Germination failure of seeds and yet is bought expensively
34	M	Poor germination of seeds	Yes	Germination failure, Poor harvests and low income in the HH	Maize remedial cropping	Yes	Low price offer after harvest

35	M	Lack of grain drying carpets	Yes	Grain molding leading to low quality and low income	Timed harvest	Yes	Few acres of land available, lack of money to buy seeds during planting time
36	M	No challenge as yet in scheme	Don't know	N/A	N/A	No	Offers good income
37	M	Failure to satisfy seeds demand by farmers, complain of deteriorating soil fertility, complain of poor seeds germination and also of expensive seeds	N/A	N/A	No response (can't tell)	N/A	N/A
38	M	Complain of declining soil fertility, unsatisfied demand for seeds, expensive seeds	N/A	N/A	Farmers are beginning to practice crop rotation, and planting farmer saved seeds (OPV)	N/A	N/A
39	M	Post harvest handling as in poor grain storage resulting to poor grain quality. Also poor roads condition that worsens during rainy season rendering it almost inaccessible.	N/A	N/A	For post harvesting-maintain routine trainings to farmers. For poor roads, we encourage bulking of grains in accessible areas with sit coordinators	N/A	N/A

Source: Field data, August 2013

Appendix I: Raw data for analysis 4 –Improving the scheme

What strategies do you suggest for action by Mukwano Company, government, and farmers in order to improve further sunflower growing in Lira district?				
Respondents	Sex	Areas of action by Mukwano	Areas of action by government (central)	Areas of action by farmers
01	F	Build bulking stores, provide good seeds that germinates, provide seeds on loan	Ensure price stability as set out by Company (price control)	Stop side selling grains after harvest
02	F	Respects buying price of grains set, consider consulting farmers in setting buying price for grains	Build bulking stores	Farmers continue operating in groups
03	F	Build bulking stores, provide farmers with drying carpets	Improve roads in their locality to help in marketing their produce	Farmers continue operating in groups
04	F	Build bulking stores	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
05	F	Provide seeds on loan to farmers especially widows	Provide farmers with ox ploughs	Farmers continue operating in groups
06	F	Provide seeds on loan to farmers, Also provides farmers with loans	Build bulking stores, improve roads in their locality to help in marketing their produce, ensure seeds are tested in farmers ecological site before allowing them to plant	Farmers continue operating in groups
07	M	Build bulking stores, provide farmers with drying carpets	Provide farmers with ox ploughs, improve roads in their locality to help in marketing their produce	Farmers continue operating in groups
08	F	Build bulking stores	Ensure price stability as set out by Company (price control), tighten law to enforce tree cutting because it's affecting rainfall pattern in their areas	Farmers continue operating in groups, plant always food crops besides sunflower
09	F	Provide good seeds that germinates, and also provides farmers with drying carpets	Provide farmers with ox ploughs	Farmers continue operating in groups
10	F	Respects buying price of grains set	Provides farmers with loans, continue maintaining security to prevent LRA rebels return	Farmers continue operating in groups
11	F	Build bulking stores	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
12	F	Respects buying price of grains set, and Build bulking stores	Ensure price stability as set out by Company (price control), Enforce competition during sale of grains	Farmers continue operating in groups
13	M	Build bulking stores, uphold and continue promoting food security crops and support other enterprises such as beekeeping	Ensure price stability as set out by Company (price control), improve roads in their locality to help in marketing their produce, source better markets for their produce	Farmers continue operating in groups
14	F	Provide farmers with ox ploughs	Ensure price stability as set out by Company (price control), provide good seeds that germinates	Farmers continue operating in groups
15	M	Build bulking stores	Improve roads in their locality to help in marketing their produce	Farmers continue operating in groups

16	M	Build bulking stores, provides farmers with drying carpets	Provide farmers with ox ploughs	Farmers continue operating in groups
17	M	Provide seeds on loan to farmers, Ensure price stability as set out by Company (price control)	Build bulking stores, improve roads in their locality to help in marketing their produce	Farmers continue operating in groups
18	F	Provides farmers with loans, Ensure price stability as set out by Company (price control)	Provide farmers with ox ploughs	Farmers continue operating in groups
19	M	Ensure price stability as set out by Company (price control), Provides farmers with loans	Improve roads in their locality to help in marketing their produce	Farmers continue operating in groups
20	M	Provides farmers with drying carpets, Ensure price stability as set out by Company (price control), Provide seeds on loan to farmers	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
21	F	Provides farmers with loans, provides farmers with drying carpets	Provide farmers with ox ploughs	Farmers continue operating in groups
22	F	Provides farmers with loans, Build bulking stores	Provide farmers with ox ploughs	Farmers continue operating in groups
23	M	Provides farmers with loans, provides farmers with drying carpets, provide seeds on loan to farmers, provide more farmer trainings	Build bulking stores	Farmers continue operating in groups
24	F	Provides farmers with loans, Ensure price stability as set out by Company (price control)	Build bulking stores	Farmers continue operating in groups
25	M	Provides farmers with loans, Ensure price stability as set out by Company (price control)	Ensure price stability as set out by Company (price control), backstop extension services	Farmers continue operating in groups
26	M	Build bulking stores, Provides farmers with loans	Improve roads in their locality to help in marketing their produce, continue maintaining security to prevent LRA rebels return	Farmers continue operating in groups
27	M	Provides farmers with loans, Build bulking stores, Provide farmers with ox ploughs	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
28	M	Ensure price stability as set out by Company (price control), Build bulking stores, Provide good seeds that germinates	Backstop extension services	Farmers continue operating in groups
29	F	Provides farmers with drying carpets, Ensure price stability as set out by Company (price control)	Build bulking stores	Farmers continue operating in groups
30	M	Build bulking stores, Provides farmers with loans, Provide farmers with ox ploughs	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
31	M	Build bulking stores, provides farmers with drying carpets, provide seeds on loan to farmers	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
32	F	Build bulking stores, Provides farmers with loans, Provide farmers with ox ploughs	Improve roads in their locality to help in marketing their produce	Farmers continue operating in groups

33	M	Build bulking stores, Provides farmers with loans	Improve roads in their locality to help in marketing their produce, Provide farmers with ox ploughs	Farmers continue operating in groups
34	M	Provides farmers with drying carpets, Provides farmers with loans	Provide farmers with ox ploughs	Farmers continue operating in groups
35	M	Provides farmers with loans, Ensure price stability as set out by Company (price control)	Ensure price stability as set out by Company (price control)	Farmers continue operating in groups
36	M	Ensure price stability as set out by Company (price control), provides farmers with drying carpets, , Provide farmers with ox ploughs	Improve roads in their locality to help in marketing their produce	Farmers continue operating in groups
37	M	Support farmers with production inputs especially recoverable seeds	Update liberalization policy on prices to have price control (indicative farm gate prices) for commodities	Balance land allocation to production to food and non-food crops
38	M	Accept competition in grain sales with other buyers. Mukwano should open up in sharing information with the local government in their operations	Improve roads in the farmer's locality to make marketing agro products more efficient. Could consider constructing bulking stores within farmers vicinity (parishes)	Strive to adopt technologies introduced to succeed in FaaB. Farming groups should Institute and integrate savings in their group activities
39	M	To Continue promoting and sustaining the investments and scheme for the benefit of stakeholders	Take over and provide extension services. Take a lead in the identification and research into viable local seeds variety, production and multiplication through a private public partnership arrangement	Integration of group savings into the producer organizations (or FGs) activities

Source: Field data, August 2013

Appendix J: Photo gallery



Source: Field photos, August 2013