AGRIBUSINESS EXTENSION SUPPORT AND PERFORMANCE OF SMALLHOLDER RICE FARMERS IN AMOLATAR DISTRICT, UGANDA.

BY

FRANCIS OJOK

B.Sc. Agric (MUK), PGD Educ (KU) & PGD PPM (UMI)

REG.NO: 13/MMSPPM/31/077

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DECLARATION

I, Francis Ojok hereby declare that this study is my original work and neither a duplication of another study nor has it been published and/or submitted for any degree award to any other University or Institution of higher learning before but a culmination of my own overwhelming and total endeavours. All the pieces of work cited in this report have been fully acknowledged in the references.

Signature: --------------------------------------Date--

Registration No: 13/MMSPPM/31/077

Uganda Management Institute (UMI).

APPROVAL

This is to certify that we have supervised this dissertation entitled, "*Agribusiness Extension Support and Performance of Smallholder Rice Farmers in Amolatar District, Uganda*" and found it worth for submission for examination with our approval as Uganda Management Institute Supervisors.

Supervisors:

_____Date:_____

Dr. Sylvester Kugonza

Senior Consultant & Dean, Department of Public Policy and Governance

Uganda Management Institute

_____Date:_____

Mr. Alinda Fred

Research Fellow, Department of Research

Uganda Management Institute

DEDICATION

"Effort only fully releases its reward after a person refuses to quit". Napoleon Hill.

This study is dedicated to our beloved children Mark Victor, Deogratious Billy and Carol Peace for the hopes and inspirations they instil in me, for bringing us joy and prospects.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CVI	Content Validity Index
DDP	District Development Plan
Df	Degree of freedom f -statistics
DSIP	Development Strategy and Investment Plan-MAAIF
FAO	Food and Agricultural Organisation of United Nation
FID	Farmers Institutional Development
HDI	Hope Development Initiatives
ICT	Information Communication Technology
IFAD	International Fund for Agricultural Development
IFC	International Finance Cooperation
IMF	International Monetary Fund
MAAIF	Ministry of Agriculture, Animal Industries and Fisheries
MoFPED	Ministry of Finance, Planning and Economic Development
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organization
NDP	National Development Plan
NRDS	Uganda National Rice Development Strategy
OWC	Operation Wealth Creation
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernization of Agriculture
SACCOS	Savings and Credit Cooperative Society
T & V	Training and Visit system of Extension
UBOS	Uganda Bureau of Statistics
UMI	Uganda Management Institute
WB	World Bank

ABSTRACT

Many concerns have been raised on the extent to which agribusiness extension support contributes to performance of smallholder rice farmers, In light of the challenges facing implementation of NAADS agribusiness extension programme, this study establishes the influence of agribusiness extension support on performance of smallholder rice farmers in Amolatar District. Specifically, the study sought to establish the extent to which access to agribusiness advisory services; agribusiness technologies and Farmer Institutional Development support influences performance of smallholder rice farmers in the District. The study employed a cross sectional research design and used both quantitative and qualitative approaches to collect and analyze data from 174 respondents. The quantitative analysis employed ANOVA to test for statistical significance of differences in mean yield, profits and incomes between beneficiaries and non-beneficiaries of NAADS agribusiness support.

The study findings revealed significant differences ($p<0.05$) in productivity, profitability and income between beneficiaries and non-beneficiaries of NAADS agribusiness advisory services. Significant differences were also realized in productivity and incomes between farmers who accessed NAADS agribusiness technologies and those who did not otherwise. Further still, significant differences ($p<0.05$) were observed in productivity and incomes between members and non-members of NAADS farmer groups. In terms of magnitude for example, farmers who accessed NAADS advisory services, realized significantly higher yields by 29.9%, higher profits by 25.5% and incomes by 33.6%. Those who accessed agribusiness technologies had differences in yield by 35.5%, profit by 29.9 % and incomes by 21.2% while FID support revealed differences in yield by 41.3%% and incomes by 27.3 %. Based on these findings, it was concluded that NAADS agribusiness extension support significantly contributed to performance of smallholder rice farmers in terms of enhancing their productivity and incomes.

The study recommends the need for concrete extension structure and system in Uganda for efficient and effective delivery of agribusiness extension support to smallholder farmers and scaling up agribusiness support towards enhancing farmers' access to incomes and improving their livelihood. The study suggested areas for future research in performance of other enterprise supported by NAADS, why NAADS extension programme failed, extension performance under Operation Wealth Creation and single spine systems in Uganda..

CHAPTER ONE

1.0 INTRODUCTION

1.1 Introduction

This study established the influence of agribusiness extension support on performance of smallholder rice farmers in Amolatar District. Agribusiness extension support was conceived as independent variable while performance of small holder rice farmers was dependent variable as diagrammatized and explained in conceptual framework (Figure 1). In this chapter, background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, hypothesis, scope of the study, significance of the study, justification, operational definition of terms and concepts were covered.

1.2 Background to the Study

This section presents the historical, theoretical, conceptual and contextual background of the study. In this study, agribusiness extension is viewed as a system that facilitates access by farmers, their organizations and other market actors to knowledge, information and technologies; their interaction with partners in research, education, businesses, and other relevant institutions that assist rice farmers to develop their own technical, organizational and managerial skills and practices (Christoplos *et al*, 2011).

In relation to its role in rural livelihoods, agribusiness extension encompasses the entire set of organizations that support and facilitate people engaged in agricultural production to solve their problems and to obtain information, skills, advisory services and technologies to improve their livelihoods and well-being (Birner, 2006).

Since a livelihood comprises the capabilities, assets and activities required for a means of living, agribusiness extension intends not only to increase productivity and income (Anderson

& Feder, 2007), but also to improve multifaceted aspects of rural life that can be broadly termed as performance of the small holder farmers.

Extension impacts have been associated with improvements in productivity and household incomes. A worldwide review of extension services show that the impact of extension services on rural livelihoods is mixed: very high rates of return in some cases and negligible achievements in other cases, (Semana, 2004).

It is also widely acknowledged that estimation of agribusiness extension impacts on rural livelihoods is challenging in terms of dealing with attribution issues and linking cause and effect quantitatively, (Anderson & Feder, 2007).

1.2.1 Historical background

Agricultural extension to farmers has a long history prior to the emergence of modern forms of it in the nineteenth century, (Jones, 1994) and Jones & Garforth, (2013). The oldest record was found in Mesopotamia (roughly, present-day Iraq) around 1800 B.C. Archaeologists have unearthed clay tablets of the time on which were inscribed advice on watering crops and getting rid of rats and these were important for mitigating any potential loss of taxation revenue from farmers (Ahmed, 1982), as cited in Bne Saad, (1990). Some hieroglyphs on Egyptian columns also gave advice on avoiding crop damage and loss of life from the Nile's floods.

An important advance in agricultural extension was the beginning of agricultural writings. The earliest were written during the ancient Greek and Phoenician civilizations, but some of them were adapted by Roman writers. Latin texts were written frequently drawing on practical farming experience, which aimed to help Roman landowners to maintain and improve their-estates and their revenues (White, 1977).

Around 25 A.D, agricultural extension was started in china by late Han dynasty (25-220 A.D), Sung & Yuan dynasties (960-1368 A.D), Ming (1368-1644 AD) & Chi'ing (1644-1912 A.D). These dynasties were not only driven by the growing population and periodic threats of famine, but also by the state's recognition of the importance of well-coordinated extension work on agricultural recommendations if the most benefit was to be achieved (Perkins, 1969; Elvin, 1973; Bray, 1984; Delman, 1991) as cited in Jones, (1994).

Similarly, the birth of modern agricultural extension services came in 1945 with the crisis of potato blight disease that wiped out potatoes in Europe and resulted into famine. .Later extension programmes extended from United Kingdom (UK) to Germany, France and North America in the mid-19th century. Again extension programmes continued to spread to Japan in 1900; Australia in 1970s and to most African countries in 1914. This was enforced when the European colonial powers looked to their overseas territories like Uganda as a source of tropical agricultural products or raw materials for their agro based industries, (Lucas, 1913).

Despite a long connection with some of the colonial areas, the Europeans remained largely ignorant of many tropical agricultural plants. The solution to this was to establish experimental and demonstration gardens called "Botanical Gardens." The earliest was opened in 1821 at Peradeniya, Sri Lanka (Ceylon). Smaller ones were also created in several Caribbean islands and some West African territories.

In Uganda, history of agricultural extension support date back to the days of British colonialism with the establishment of Entebbe Botanical Gardens which started between 1898 to 1901 (Semana, 1998).

Over the years, several disparate agricultural extension service systems have been introduced and practiced (UNFFE, 2014).

Agricultural extension in Uganda has undergone a number of transformations from regulatory 1920-1956, advisory 1956-1963, advisory education 1964-1971, dormancy 1972-1981, recovery 1982-1999, educational 1992-1996, participatory education 1997-1998, decentralized Education 1997-2001 and currently agricultural and agribusiness advisory services under project model of contract extension system and private service providers.(Semana,1998).

Each of the above extension approach had strengths to build on and weaknesses to change or improve, but had major challenges of social-economic and political environment.

However, in spite of good intentions, all of the above mentioned extension approaches did not address directly the needs of farmers. Over time farmers' needs varied, marketing was liberalized and so the need arose for setting up farmers' associations to address the problems that are unique to farmers (UNFFE, 2014).

Major reforms of agricultural extension in Uganda came under National Agricultural Advisory Services (NAADS), where the focus on agribusiness was clearly envisaged. This embraced further decentralization of extension responsibilities from districts to sub county level, contracting agribusiness extension services from various categories of service providers, involving farmers in programme planning, monitoring, evaluation ,and decision making about extension service providers, establishing cost sharing between National, Local Governments and farmers, and creation of more effective operational link between farmers, market, extension workers and agricultural researchers (Friis-Hansen & Kisauzi, 2004).

These new approaches of agribusiness extension service delivery in Uganda stand in contrast to past extension programmes in a number of ways; It moves away from monolithic and civil service to heavy structures by explicitly encouraging plurality in extension service provisions

and methodologies which attempt to make agribusiness extension services perhaps much more directly responsive to farmers self-identified needs (Agricultures Network, 2014).

According to Hailu (2014), the latest innovation and development in agribusiness extension support in Uganda is the application of Information and Communication Technologies (ICT), particularly mobile phones in agribusiness extension service delivery. ICT services are playing key roles in transforming agriculture in developing world right from delivery of price information to providing extension services, weather forecast, farm management, insurance and mobile banking (FIT Uganda, 2015).

In Uganda these are being practiced by; FIT Uganda, INFOTRADE BDS, Grameen Foundation-MTN-UPLAB, Centenary Bank, CARE. However, Uganda, like any other developing country is still grappling with a much wider digital divide, CT skill gaps, data security and management in comparison to other developing countries already accessing ICT for agriculture services in full scale,(UNCST, 2002).

1.2.2   Theoretical Background

This study employed Rogers (1962), Diffusion of Innovation (DOI) theory as the main theory guiding the study and the major tool of analysis. Diffusion of innovation theory assumes that new ideas and discoveries spread to members of a social system. It shows that new innovation / information spread through communication channels to a particular society, (Diane, 2004). The theory was applied in this study to explain how smallholder farmers plan, analyse and make decision from agribusiness extension supports to adopt or accept advices and technologies that benefit them. Researchers in management, particularly behavioural scientists are advocating for methodological paradigm triangulation where quantitative and qualitative approaches are combined. This study applied theory-then research model.

On the other hand, other theories like social capital and institutional theory which assumes rationality (cost and benefit) in actor's economic transaction-minimising transaction cost in choice of production technologies and agribusiness advisory services utilisation (Kugonza, 2009). Institutional and other transaction costs and benefits point out gaps in the current state of knowledge, it facilitates transaction in agribusiness (Laundry, 2004: Peng, 2004) cited in Kugonza (2009: pp-42).

The study also borrowed from rational comprehensive theory advanced by Guanton and Hodge (1960) which defines the ultimate aim of social and societal progress based on notion of public interest thus planning solutions that are of common benefit to them, (Comte, 1875).

Guanton and Hodge (1960) assumed that rational actors make rational decisions through purely rational process that defines analysis and make decision that accrues maximum benefits to them and which in this study, the theory helped in analysing FID support and smallholder rice farmers performance basing on how the make decision in a group. Detail theoretical review on the above mentioned theory is presented in chapter two under theoretical review section.

1.2.3   Conceptual Background

Different authors and scholars at different levels have viewed agricultural extension in a number of ways. Of interest to this study has been: 1) Bardsly (1982) cited by Nwuzor (2009), that views agricultural extension as a service or system which assists farm people through educational procedure in improving farming methods and techniques, increasing production efficiency and incomes, bettering their levels of living and lifting social and educational levels of rural people;

2) Semana (1998) explained the understanding of extension concept as based on three premises: being educational, having a philosophy and scope with responsibilities. The educational element of extension is two folds: being informal and non-formal. The

seriousness and thoroughness of extension is governed by the second premise of extension concept-the extension philosophy which states "start where people are, with what they have and help them, help themselves".

In this study, agribusiness extension supports is looked at as giving technical advice on production and postharvest handling, marketing, assistance with Business Development Services (BDS) and access to credit, Farmer Institutional Development (FID) by NAADS programme and government extension agents. Furthermore it is also seen as a development strategy to organize farmers, train and link farmers with suppliers and buyers. (Baruah, 2013)

Agribusiness extension support system is also responsible for channelling of market information to farmers and researchers as well as providing a feedback to researchers and extension programmes on effective use of such information. (Mwanje & Duvel, 1998)

This study further, considered agribusiness extension support as a system which assists farm people through educational procedure in improving farming methods and techniques, increasing incomes, production efficiency and profitability of the enterprises (Nygaard *et al.*, 1997)

In this study NAADS selected as one of the public-private agribusiness extension programme funded by Government of Uganda and donors. The programme is being implemented in all the districts and sub counties of Uganda including Amolatar District where alongside other programmes is supporting key rice agribusiness extension interventions along production-research-extension-farmer market value chain continuum through five components namely: developing agricultural technology and strengthening research, enhancing partnerships between agricultural research, advisory services and other stakeholders, strengthening farmer Institutional development, supporting agribusiness extension services and market linkages

and program management (ATAAS PIM, 2011). This would give a clear picture of how agribusiness extension support impacts on smallholder farmers in Uganda.

Similarly, performance was conceptualized in this study as the process of quantifying the effectiveness of NAADS agribusiness extension interventions in terms of access to agribusiness advisory services, technologies and FID support to increase productivity, profitability and incomes from smallholder rice agribusinesses (Neely *et al.*, 2002).

The study also borrowed from Khan and Shah (2011) who defined performance as a system that helps organizations to manage and ensure that all their functions and activities are in line with the strategy to achieve results and create stakeholders value.

According to UNDP (2002) Hand book, project performance is defined as the achievement of targeted results efficiently and effectively. In a project also, there is a two way relationships between a project and its stakeholder who can influence it performance (Bourne, 2011)

1.2.4   Contextual Background

According to World Bank report (2010), Uganda is a country where 92% of the poor live in rural areas and the majority of the poor earn a living from informal sector agribusinesses. In Uganda, smallholder farmers play a vital role in global food system hence survival and effectiveness of agribusiness development projects, (World Bank, 2012). Agribusiness development extension services delivery have great potential in Uganda and is still believed to be one possible mechanism to improve the incomes of smallholder farmers and provide them with the benefits of economic liberalization. It has multiplicative effects in the rural and broader economy (Omamo *et al.,* 2006).

Globally, Rice has been gathered and cultivated by women and men for more than 10,000 years (Kenmore, 2003). Tsubi (2004) as cited in MAAIF, (2012) also observed that the total area under rice cultivation globally is estimated to be 150 million hectares (Ha). The annual

production averages between 400 to 500 million MT (FAO, 2012). Xu Kuangdi *et al.,* (2003) study indicates that, rice represents 29% of total grain crop output worldwide. However, it has been reported that West Africa and East Africa have the lowest average grain yields in Africa (1.9 and 2.3 tonnes/ha, respectively), (MAAIF, 2012).

Historically, rice has been one of the strategic crops under NAADS programme in Uganda and Amolatar District in particular. Its contribution to smallholder farmers' productivity, profitability and incomes is significant and sufficient, particularly for food security at household level (FAO, 2012). The low productivity at smallholder farmers' fields is due to several constraints, including: high incidence of pests, weeds and diseases, drought and poor water control, poor seed management, poor soil fertility management, lack of access to credit, farm inputs, farm machinery and animal traction (MAAIF, 2012).

According to MAAIF, (2012) in Uganda NRDS 2008-2018, Rice production in Uganda started in 1942 mainly to feed the World War II soldiers. Today rice is grown mainly by small holder farmers throughout the country with a total estimated production at 177,000 MT of un-milled rice which is about 115,000 MT of milled rice.

Rice is regarded as one of the strategic enterprises that will enhance attainment of MAAIF-DSIP's objectives because it has a high multiplier effect along the value chain and ability to develop other sectors like feeds or livestock's industry. It also has high returns on investments, high production potential in the future and demonstrated a high ability to reduce poverty ,(MAAIF, 2010).

The Uganda NRDS revealed that 0.1% (68,446 hectares) of farmland in Uganda is under large scale farming whereas 99% (8,400,789 hectares) is under small-scale farming. About 80% of the rice farmers in Uganda are smallholder farmers with acreage less than 2 hectares,

use simple technology, little or no fertilizer use, and poor quality seed amongst others (MAAIF, 2012). These call for support inform of agribusiness extension services.

Uganda has three major rice ecologies; rain-fed lowland, irrigated lowland and rain fed upland. Most of the rice is grown under rain-fed lowland ecology at the fringes of wetlands in Eastern Uganda, Lake Kyoga catchment and the foot hills of Mt. Elgon (MAAIF, 2012). The average paddy production and grain yield obtained by smallholder farmers in Africa (1.87 tonnes/ha) is well below the world average of 3.84 tonnes/ha (FAO, 2003).

Although the crop is increasingly becoming a staple food crop in the country, especially in urban areas; available statistics however, show that Uganda is a net importer of rice and will continue to do so unless domestic production improves significantly (World Bank, 2012).

In order to actualise Uganda National Development Plan (NDP) and Development Strategy and Investment Plan (DSIP) rice-related objectives and activities, a National Rice Development Strategy (NRDS), 2008-2018) has been developed. The NRDS lays out Uganda's plan for promotion of rice production between 2009/10-2017/18 with the aim of creating quality rice self-sufficiency in Uganda. This will increase rice production in Uganda from 177,800 MT of un-milled rice in 2008 to 313,000 MT in 2013 and 680,000 MT in 2018. Rice production, processing and marketing in Uganda has been promoted by NAADS agribusiness extension programme.

In Amolatar District, rice is one of the strategic enterprises heavily supported under NAADS agribusiness extension programmes for the last eight years. Whether this has enhanced the performance of smallholder farmers is not known and not clear, (Betz, 2009). Questions have been asked about the effectiveness of agribusiness extension support and its efforts in alleviating poverty among rural farmers especially on rice participatory technology development, promotion and various agribusiness interventions extension support,

(DENIVA, 2005). Sustainable financing of these services remain a challenge because resource-poor farmers cannot afford to pay for them. This is further worsened with limited value addition support, market dynamics, weak farmer institutions and infrastructures (Semana, 1998; Rivera *et al*, 2000).

1.3 Problem statement

Agribusiness extension support to smallholder farmers play a central role in economic growth and poverty reduction in Uganda, (MAAIF, 2012). In Amolatar District, agribusiness extension support to rice smallholder farmers have been provided with objective of enhancing their productivity, profitability and incomes. However, such interventions have generated limited results (Amolatar District Production Review & Monitoring Report, 2014). For example, poverty has remained high at 67% among smallholder rice farmers in Amolatar District compared to national average of 35%. (UBOS, 2010: Amolatar District DDP, 2013). Research, extension and market service delivery systems have been inadequate (Mette *et al*, 2013). Extension agents reach less than 10% of the farmers, technology adoption rates is estimated at less than 35% while on-farm production levels are below 30% of the research station performance level, (IFPRI, 2012). For instance public concerns have been raised on the extent to which NAADS agribusiness extension support is contributing to improvement in performance of smallholder rice farmers, (MAAIF, 2014); Uganda government suspension of NAADS programme in September, 2007 and July, 2014 was on grounds of implementation failures, (Betz, 2009); NAADS reform and restructuring in July, 2014 (MAAIF, 2014) without any empirically researched evidences. All these issues point to direction of poor performance of agribusiness extension support in Uganda and Amolatar District in particular. In the face of the above challenges, the extent to which access to agribusiness extension services delivery have influenced productivity, profitability and incomes of smallholder rice

farmers remain unknown in Amolatar District. This study was set out to investigate and fill this information gap.

1.4 Purpose of the study

The purpose of the study was to establish the influences of agribusiness extension support on performance of smallholder rice farmers in Amolatar District.

1.5 Objectives

1) To establish the extent to which access to agribusiness advisory services influence performance of smallholder rice farmers in Amolatar District.

2) To establish the extent to which access to agribusiness technologies influence performance of smallholder rice farmers in Amolatar District.

3) To establish the extent to which Farmer Institutional Development (FID) support influences performance of small holder rice farmers in Amolatar District.

1.6 Research Questions

This study attempted to answer the following key questions:

1) To what extent does access to agribusiness advisory services influence performance of smallholder rice farmers in Amolatar District?

2) To what extent does access to agribusiness technologies influence performance of smallholder rice farmers in Amolatar District?

3) To what extent does access to FID support influences performance of smallholder rice farmers in Amolatar District?

1.7 Hypothesis

1) There is a positive significant influence of access to agribusiness advisory services on performance of smallholder rice farmers in Amolatar District.

2) There is a positive significant influence of access to agribusiness technologies on performance of smallholder rice farmers in Amolatar District.

3) There is a positively significant influence of access to farmer institutional development support on performance of smallholder rice farmers in Amolatar District.

1.8 Conceptual framework

A conceptual framework illustrates influence and relationships of independent and dependent variables. The independent variable was agribusiness extension supports to smallholder rice farmers in Amolatar District and dependent variable was performance of smallholder rice farmers. It was hypothesized that there are positively significant influences and relationships between increased access to agribusiness extension support in terms of access to agribusiness advisory services, agribusiness technologies and farmer institutional development supports and performance of smallholder rice farmers in Amolatar District as illustrated in the **figure 1** below

AGRIBUSINESS EXTENSION SUPPORT (IV).
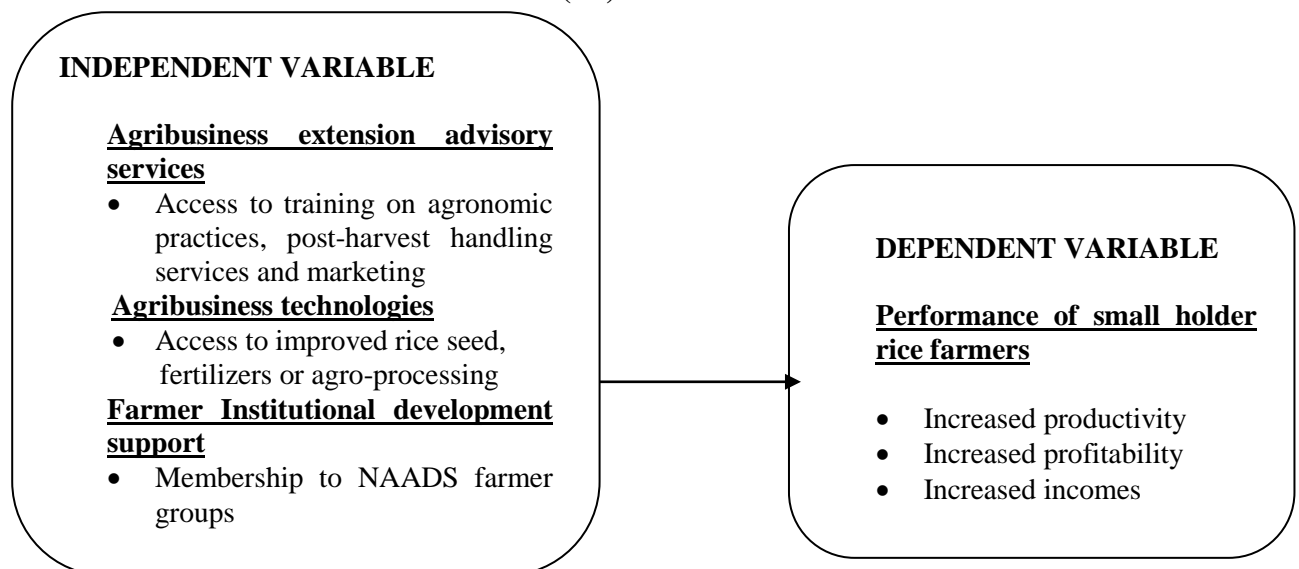
Source: (Adopted and modified by the researcher from Ncube, 2005, Lazear, 2004, World Bank, 2002, Chandlers, 1962)

Figure 1: Conceptual framework explaining agribusiness extension supports and performance of small holder rice farmers in Amolatar District

1.9 Significance of the Study

To farmers, the study suggests practical ways on how the public actors implement agribusiness extension supports.

To academia, it allows for appreciation of application of research theories, and principles and added to stock of knowledge and literature in agribusiness extension field.

To project policy implementers, project specialists and Local Governments, it facilitates new development perspectives toward agribusiness extension supports programmes in Uganda and Amolatar District in particular.

To community, the study aided in guiding efforts of agribusiness extension support programmes in local community and mobilization of social capital. It helped community appreciate agribusiness extension interventions programmes and needs for better management skills especially in commodity value chain.

To Non-Governmental Organisations (NGOs) and other stakeholders, the study remains a useful self-examination tool for reflection on their programme performance among, NGOs, governmental organizations and international donors and used as reference in academia and the donor community.

1.10 Justification of the study

Agribusiness extension support is what drives the economies of developed nations. However in Africa, the question of why development is not working has not been answered for a long time, and the search for a solution continues, (World Bank, 2008).

The government of Uganda and NGOs have been awarded significant amounts of money for rice agribusiness extension services delivery and huge public investments in rice agribusiness extension support programme under NAADS totalling to approximately 5.5 billion (Amolatar

District NAADS Review & Monitoring Report, 2014), with the aim of poverty reduction among farmers, yet the situation doesn't seem to change for the better.

Over 80% of labour force in Uganda is employed in the agricultural and agribusiness sector. Modernization of agriculture is central in fighting poverty and agribusiness development support is one such key strategy for achieving poverty reduction (NDP, 2010: Semana, 2004). The NAADS agribusiness extension services delivery programme and current reforms places Uganda in the forefront of agribusiness services reforms in Africa (Friis-Hansen *et al.*, 2004: Bashaashasa *et al.,* 2011). These reforms places high expectations to farmer's capability of understanding cause and effects of their agribusiness problems, (Betz, 2009).

Previous studies investigated smallholder adoption of technologies and production using empirical models, Cob Douglas production function and dilemma of changing agricultural extension policy in social-economic and political context of Uganda (Semana, 2004: Betz, 2009; Bashaashsa *et al.*, 2011).

Few studies used diffusion of innovation theory in explaining effectiveness of agribusiness extension support to smallholder rice farmers' project in Uganda. The study brings to the fore critical issues concerning public agribusiness extension support and smallholder rice farmers' performance in Amolatar District.

Amolatar District also generates a lot of revenue for council operations from upcoming rice agro-processing facilities, markets, transporters and traders. However, the amount and quality of agribusiness extension services the District is giving back to farmers in terms of agribusiness advisory services and marketing infrastructures is not known (Amolatar District Production & Marketing Committee Report, 2014).

1.11   Scope

The scope of the study on agribusiness extension support and performance of smallholder rice farmers in Amolatar District included the geographical, time and content scope as explained below.

1.11.1 Geographical scope

The study was conducted in Amolatar District where NAADS agribusiness extension programme was sample due to its uniqueness in heavily supporting rice agribusiness as a strategic enterprise. It covered one Town council (Amolatar Town Council) and three (3) Sub counties of Agikdak, Etam and Namasale Sub-county. This was randomly selected since rice is produced in all the sub-counties in the district.

1.11.2 Time scope

In terms of time space, the study covered the period from 2010 to 2014. This was the period when the NAADS- ATAAS Programme was implemented with detailed agribusiness extension component. The NAADS programme also rolled out to all the sub counties in Amolatar District during this period. The data collection was conducted between September and November, 2014.

1.11.3 Content scope

The study sought to establish the extent to which agribusiness extension support in terms of access to agribusiness advisory services, access to agribusiness technologies and access to farmer FID support influences performance of smallholder rice farmers in terms of incomes, productivity and profitability. The respondents in the study were chosen from those who directly and indirectly benefited from NAADS public agribusiness extension support programme.

1.12 Operational Definitions of Terms and Concepts

In this study, operationally, the following terms are defined as below:

Agribusiness: Activities smallholder farmers are involved in right from production, access to input, value addition, processing up to consumption. A broad concept that covers services to entire value chain from producer, input suppliers, agro-processors, traders, and facilitators (CTA & World Agro Forestry Centre, 2013).

Extension:-Bridging the gap between the farmers and the sources of information or knowledge. Sources included organisations or institutions generating knowledge and technologies such as research centres (Semana, 1998).

Agribusiness extension supports: Inputs in extension system that help a farmer to increase production, access market and increase incomes such as training, education, technologies, information, planning demonstration, credit and advice (NAADS Guidelines, 2010).

Farmer Institutional Development support-This is a component under NAADS that support farmers to form groups that later develop into higher farmer organizations to enhance storage, easy access to training ,credit services, bulk marketing and other services.

Smallholder farmer: Farmers cultivating less than 5 acres of land.

Beneficiaries: Direct (intended) or indirect target group that received benefit from agribusiness extension project (NAADS Guidelines, 2010).

Performance: Effectiveness of smallholder farmers in utilizing agribusiness advisory services, agribusiness technologies and FID support accessed under NAADS agribusiness extension service delivery programme to increased acreages cultivated, yields obtained per acre, profits from produce sale, output per acre and incomes from rice enterprise. It could be positively or negatively influenced by intended or unintended agribusiness extension support, (Khan & Shah, 2011).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Chapter two looks at related literatures under the following themes; the theoretical review of agribusiness extension, the conceptual review of independent and dependent variables and related review of existing literature on the agribusiness extension support and performance of smallholder rice farmers. Much as the researcher is aware of broader literature in general agricultural extension and development fields, this study, limited literature review to agribusiness focused areas of extension and related studies, applications and contexts.

The review is presented objective by objective revealing contributions made by earlier scholars, weaknesses and gaps in existing knowledge, methodologies and lessons learnt to help the researcher generate, refine research ideas and draw conclusion in line with the research objectives.

2.2 Theoretical Review

Research in agribusiness is complex and involves the study of problems that span across various levels of analysis –smallholder farmers, firm, inter-firm, value chain actors and markets. Due to its increasingly complex nature, agribusiness is an applied field that requires different theoretical as well methodological approaches to the resolution of agribusiness problems (Ng & Siebert, 2009). The main theory underpinning this study is the Diffusion of Innovation Theory advanced by Rogers (1962) that seeks to explain how, why, and at what rate new ideas and technologies in agribusiness spread through cultures to smallholder rice farmers.

Rogers, (1962) argues that diffusion is the process by which an innovation is communicated through certain channels over time among participants in a social system and he proposes four main elements that influence the spread of a new idea: the innovation itself, communication channels, time and a social system.

This process relies heavily on human capital; it requires that innovation must be widely adopted in order to self-sustain. He categorised adopter by adoption rate (market shares) as innovators, early adopters, early majority, late majority, laggards and leaf froggers. For proper understanding, Rogers amended these stages and came out with his own processes which are: knowledge, persuasion, decision, implementation and confirmation, (Ryan & Gross, 1943).

In agribusiness extension services delivery, this theory helps explain rate of adoption of improved technologies, practices, adoption of extension strategies, adopter's categories and innovation that follow S curve when plotted over length of time.(Semana, 1998).

Rogers also defines several intrinsic characteristics of innovation that influence an individual's decision to adopt or reject an innovation (Rogers, 1983). Rogers's six (6) factors that influence adoption of innovation are relative advantages, compatibility, complexity, simplicity, trial-ability and observability.

In contrast, a plethora of literature on the Diffusion of Innovations shows its successful application in rural contexts since the 1940s. The main focus of diffusion research is on the adoption of agricultural innovations such as herbicides, hybrid seed and fertilizers, with the most recent studies considering the uptake of genetically modified crops and modern agricultural practices in developing countries (Semana, 2004)

Diffusion of Innovation Theory is defined by Rogers (1962) as "the process by which an innovation is communicated through certain channels over time among members of a social

system." and has successfully been applied in rural contexts since the 1940s. Burt (1973) explains that diffusion differs from adoption in that; it is the process by which new technologies are spread among users whereas adoption is said to be an individual, internal decision.

Communication was one of the recurring themes in Rogers' (1962) description of each category of adopter. Among other characteristics, members of each category were described in terms of their communication activities with other members and how far they reached outside the boundaries of their system to access information on a new idea.

Ryan and Gross (1943) identified communication as being extremely important to the diffusion of innovations process. Rogers (1962) provides a definition immediately after that for diffusion: "Communication is a process in which participants create and share information with one another in order to reach a mutual understanding".

However, the major criticism of this theory is that diffusion manifest itself in different ways in various cultures and fields and highly subjects to the type of adopters and innovation decision process as argued by Diane, (2004). Similarly, criticism of diffusion theory comes from much evidence gathered by Rogers (1962) only from agricultural fields, methods and medical practice. Continual innovation attracts new adopters along the S-curve. Eveland, (1986) placed the contributions and criticisms of diffusion research into four categories: Pro-innovation bias, individual-blame bias, recall problems, and issues of equality.

2.2   Conceptual Review:

The term "agribusiness" first appeared in Davis & Goldberg, (1957) seminal book entitled "A concept of Agribusiness", and this described three distinct yet interdependent sectors in a global food system. These sectors include suppliers of agricultural inputs, producers of agricultural commodities, and institutions that perform the functional aspects associated with marketing food and fibre products. (Baruah, 2013)

The functional aspects of marketing included product exchange, processing, storage, and transportation, as well as suppliers of market information, risk management, and financial services related to product distribution. Fundamental to the concept of agribusiness is that many problems related to agriculture are interrelated and dependent upon political, sociological, economic and behavioural factors (King *et al.,* 2010; Ng & Siebert 2009; Sonka & Hudson 1989).

According to Jamandre, (2007), in essence, agribusiness consists of all industries surrounding food production; ultimate end-user is the consumer, with marketing as the driving force behind all profitable activities. With this in mind, there are basically three "sectors" that comprise agribusiness, as expressed in the following diagram:
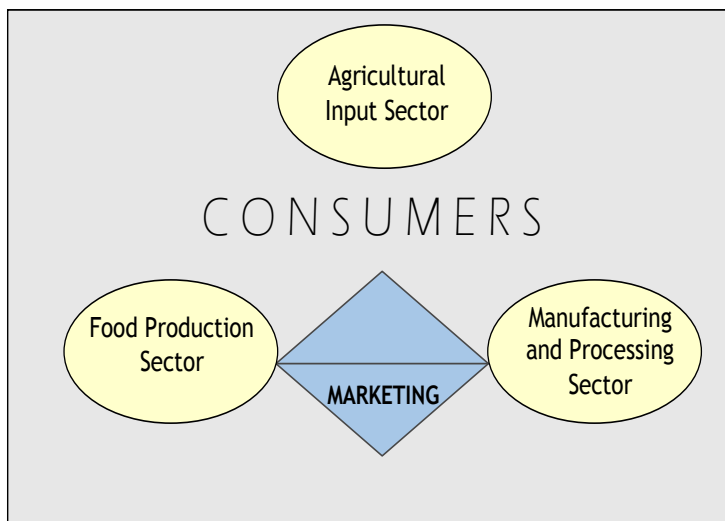
Figure 1. 2: Agribusiness concept

Source: Adapted from Jamandre, 2007.

According to Jamandre, (2007) in his brief on the Agribusiness Perspective , expounds that agribusiness encompasses all operations involved in the production of farm inputs, the use of these farm inputs in the cultivation of crops or raising of livestock, the various handling and processing of agricultural commodities, and the transfer of these commodities to the end-

users. Interspersed among these operations are the various support services that provide "logistics, coordination, financing, manpower, technologies, information, policies and programs, incentives and other services" that lead to the achievement of a successful agricultural business enterprise.

Globally, agribusiness extension is relatively young (Ruby *et al.,* 2011). Agribusiness extensions have evolved from rich programme of agricultural economics to meet the current needs of a changing farmers and environment. Earlier focus was production level supply chain involving more suppliers and buyers in support of entire value chain not delivery method used.

According to Ruby *et al.,* (2011), the current agribusiness extension covers three critical areas of management; producers and agribusinesses, market analysis and intelligence and policy analysis. Whether these are being practiced among smallholder rice farmers in Uganda and Amolatar District is not clear.

In Uganda, the emergence of high value commodities, such as rice, sunflower, sesame, groundnuts, and maize (along with the technologies) has contributed to the promotion of small scale agribusiness development and income. Until now, these commodities still remain as cash resource potentials for the smallholders in Uganda (IDEA Uganda, 2004)

In the late 1980s and early 1990s, sub Saharan African countries including Uganda, witnessed wide-ranging reforms in the agricultural sector as consequences of economic structural adjustment programme implementation (World Bank, 2002). This rendered traditional extension systems inappropriate, (Semana, 2004).

The change brought on board many polices which include among others, liberalization of trade in agricultural inputs, services and output; privatization of state-owned enterprises that

supported production and marketing; and downsizing of civil servants who provided extension services (World Bank, 2002).

Uganda government developed a new strategy-Plan for Modernisation of Agriculture (PMA) based upon two strategic pillars-raising overall agricultural yield and productivity and diversifying small holder production pattern into a mix of high value, export oriented commodities, along with low value food staples (MAAIF, 2000: MAAIF, 2013).

High priority was placed on agricultural research and extension especially on improving the process of technology generation and transfer through decentralisation of activities, greater participation of potential users and improved utilisation of knowledge found in local communities (Semana, 1998)

Additionally, there has been a marked changes in the concept of agricultural extension itself, which is increasing seen in terms of commercial of farming for market with emphasis on modernisation of agriculture as opposed to family farming, which produces most the food consumed in Uganda (Agriculture Network, 2013).

2.3 Agribusiness Advisory Services and performance of smallholder farmers

Most African countries have taken keen interest to improve service delivery. People centred service delivery reforms, (Duaz, 2005). Decentralized agricultural advisory services have been a new approach for most African countries such as Ghana, Rwanda, Botswana and Namibia with the reasons of bringing services closer to farmers and to enhance participation at local level and ownership (Rivera *et al.*, 2000).

Rivera *et al.,* (2000) further argued that the pressures on extension performance calls for changes in traditional public extension systems which are now seen as outdated, top down, paternalistic, inflexible, subject to bureaucratic inefficiencies and therefore less able to cope with the dynamic demands of modern day agriculture.

According to Betz, (2009), extension worker often gravitate towards more capable and motivated farmers and information spill over between farmers. Farmers received information on new technologies and approaches through a variety of sources including formal extension, mass media, outlet such as radio or new papers, private companies and other farmers. This makes it difficult to estimate the impact of extension on output.

According to NAADS Guidelines (2005), advisory services should focus on increasing agricultural production, incomes, introduce appropriate technologies, stimulate on-farm employment, facilitate formation and strengthening farmer organizations, developing new market linkages, providing social services and conserving environment. On the contrary, agribusiness sector remains a low-input, low-output activity with high levels of transaction costs, post-harvest losses and therefore, low-level of agricultural enterprise profitability (Bashaasha *et al.*, 2011).

According to World Bank, (2002), a guide to inclusive agribusiness, companies and smallholder farmers find it difficult to enter into productive business relationship due to many structural challenges such as lack of information, skills, insecurity, insufficient resources and gaps in local infrastructures.

2.4 Agribusiness technologies and performance of small holder farmers

Many small farmers have traditionally produced their basic food needs, and sold surpluses to provide for additional needs of the household. However, this livelihoods strategy is increasingly seen as insufficient to raise rural incomes, provide the stimulus for rural development, and alleviate poverty (Benin *et al.*, 2011).

According to Nguthi, (2007) agribusiness technology promotion is the strategy used globally to increase production. In Indonesia, Integrated Pest Management (IPM) was adopted by rice farmers to increase yield while reducing production costs, (Soejitno, 1999).

Improved farming technologies such as high yielding crop varieties, chemical fertilizers, and irrigation technique have been central in raising yields in other parts of the world. However, African farmers have been much slower in adopting these new methods. Reasons farmers cite is lack of information on how to apply the improved inputs, (Morris, Kelly, Kopicki, & Byerlee, 2007).

In Malaysia, adoption of agronomic practices and recommended fertilizer application led to increased yields and income of oil palm farmers (Basiron, 1995). Similar results were also reported in South East Asia with adoption of integrated production technologies (Mayeet *et al*, 2008)

According to Kaung & Alami (1985) low grain yield is due to several factors, including the low standard of production technologies used and the predominance of cultivation in upland agro-ecosystem. Betz (2009) also contends that if improved inputs are not applied correctly, yield will be low and farmer will abandon the new technology.

Recent analysis show that for a majority of staple crops agricultural productivity is declining and any output gain is attributed to expansion of cultivated land (Kraybill, Bashsaasha, & Betz, 2009). These practices have contributed to Uganda having one of the highest rates of soil depletion in all of sub-Saharan Africa as argued by Pender *et al*, (2004) & Wortmann & Kaizzi cited in Betz, (2009).

According to Kayongo, (2012) in Uganda, the use of improved agricultural technologies has been stressed by NARO, NAADS and MAAIF as key drive to increase yields and profits that lead to reduction in hunger and poverty.

Past researches on relationship between farm sizes, factor of production and output found out those larger farms are more likely to use advance farming inputs such as fertilizers, irrigation and improved seed varieties when compared to small farms, (Feder, Just & Ziberman, 1985)

as cited in Betz (2009). Conversely, vast literature exist showing an inverse relationships between land productivity and farm size (Sen., 1962; Berry & Cline,1979) suggesting that small farms are more productive and would be better target for available resources. This study evaluated performance of smallholder farmers engaged in rice enterprise.

Similar studies conducted by Obi & Chisango (2011) in Zimbabwe using stochastic frontier model revealed significant impact of the programme on smallholder farmers due to effective use of productive factors and land. While general production has remain low, it triggers hyper inflationary situation due to supply constraints, practical implication for agribusiness was foreseen.

Study of factors influencing participation of smallholders farmers in rice development project Northern Ghana (Marteey *et al.,* 2013) show significant variation in demographic and institutional characteristics among the farmers as being influenced by age, knowledge of household head, marital status, access to off farm incomes, market price, access to credit, education and farm size and argued that packaging of technologies by institution should make it receptive to farmers through demonstration and training for better production, adoption and incomes.

A study in Uganda conducted by Friis *et al.,* (2004) on smallholder farmers in Soroti District revealed that greater involvement of farmers in development of agricultural technologies is key component in current reforms of agricultural advisory services. This requires capabilities to analyse causes and effects of their problems and to be active in adapting technologies to their local specific conditions of production which is not widely available among smallholder farmers in Uganda.

Friis *et al.,* (2004) further argues that farming is a predominant occupation but farm income is still low, therefore studies need to be conducted to determine whether access to new

technologies and markets are still key elements in reducing rural poverty. Poverty reduction initiatives hinge on yield, productivity and profitability of smallholder farm enterprise.

Soil fertility is one major determinant factor in rice productivity. The land with high agricultural potential in Africa accounts for 6% of the total (World Development Report, 2008). Hence, one way to improve soil fertility and thereby intensify production is the application of fertilizers. Fertilizer use is normally expected to boost production.

A study on effects on NAADS interventions on household's income in Kiruhura district in Uganda using both descriptive and inferential statistics revealed weak positive correlation between access to NAADS technologies and household incomes and recommended that presence of appropriate institutions, access to appropriate technologies and well functioning markets lead to agricultural productivity increase (Nateekateeka, 2013).

2.5 FID support and performance of Smallolder farmers

Over the past 20 years, the quest to explain differing performance of economy across space and time have increasingly incorporated institutions as a key ingredients and has gained wider application in explaining effectiveness of policy reforms implementation or lack of in both developed and developing countries, (Kugonza, 2009). They examined it roles in economic transaction, good governance, social policy reforms (raising or lowering transaction costs). How people interact count significantly in functioning and development of society. (Grant Ovetter, 1985: Standifid & Marshal, 2000: World Bank, 2003: Tai, 2006: Styhie, 2008) as cited in Kugonza (2009).

Public sector extension, in both developed and developing countries, is undergoing major reforms. In Uganda, these reforms include privatization of funding, delivery of extension and decentralization of authority to lower level of governments, including delegation to NGOs, farmer organization and other grassroots control (Bashaasha *et al*., 2011).

This transferred powers, functions, and responsibilities for planning and implementation of agribusiness extension services from MAAIF to local governments which faces challenges of capacity, corruptions, staffing gaps, coordination and linkages with central government (Friis-Hansen & Kisauzi, 2004; MAAIF, 2010).

Any government's commitment to developing a viable and efficient agribusiness extension system starts with development of human capital to extension advice and services to farmers as noted by Nygaard *et al.*, (1997).

In Uganda this is limited done yet the sector is the heart of the economy (NDP, 2010). On the contrary, speedy and successful implementation of key aspects of NAADS programme in Soroti District was largely a result of favourable local government and farmer institutions environments created prior to NAADS, (Friis-Hansen *et al.,* 2004).

According to World Bank (2012), a guide to inclusive agribusiness, companies and smallholder farmers find it difficult to enter productive business relationship due to many structural challenges such as lack of information, skills, insecurity, insufficient resources and gaps in local infrastructure.

Framers institutions help in movement of produce from farms to markets and market linkages and movement of produce and products from farm to consumers. Such services are lacking in Uganda as marketing boards died (MAAIF, 2009; Walusimbi & Nkonya, 2004).

MoFPED (2002) observed that there is need to revive cooperative movement in Uganda if agribusiness market linkages are to be a success. This reflects the case for NAADS approaches and traditional extension system in Uganda.

Institutional analysis of agricultural market have recently re-emphasized that market reforms are by themselves very inefficient in generating a supply response, and other accompanying interventions are needed to make sure farmers do reach markets (Kirsten *et al.,* eds., 2012).

The need for agricultural and rural information and advisory services is likely to intensify in the foreseeable future.

The mission of the NAADS agribusiness extension support, which replaces the previous extension services, is to increase farmer access to information and technology through effective, sustainable and decentralized advisory services with increased private sector involvement (GoU, 2000).

2.6 Summary of Literature Reviewed

Research in agribusiness extension services delivery is complex and span across various levels of analysis. The main focus of diffusion research is on the adoption of agricultural innovations such as herbicides, hybrid seed and fertilizers (Rogers, 1962) with the most recent studies considering the uptake of genetically modified crops and modern agricultural practices in developing countries.

Soil fertility is one major determinant factor in rice productivity. The land with high agricultural potential in Africa accounts for 6% of the total (World Development Report, 2008). Hence, one way to improve soil fertility and thereby intensify production is the application of fertilizers. Fertilizer use is normally expected to boost production.

The term "agribusiness" first appeared in Davis & Goldberg, (1957) seminal book entitled "A concept of Agribusiness", and this described three distinct yet interdependent sectors in a global food system. The sectors include suppliers of agricultural inputs, producers of agricultural commodities, and institutions that perform the functional aspects associated with marketing food and fibre products.

Fundamental to the concept of agribusiness is that many problems related to agriculture are interrelated and dependent upon political, sociological, economic and behavioural factors (King *et al*., 2010; Ng & Siebert, 2009; Sonka & Hudson, 1989).

According to Ruby *et al.,* (2011), the current agribusiness extension covers three critical areas of management; producers and agribusinesses, market analysis and intelligence and policy analysis. Whether these are being practiced among smallholder rice farmers in Uganda and Amolatar district is not clear.

Decentralized agribusiness extension advisory services have been a new approach for most African countries such as Ghana, Rwanda, Botswana and Namibia (Rivera *et al*., 2000). On the contrary, agribusiness sector remains a low-input, low-output activity with high levels of transaction costs, post-harvest losses and therefore, low-level of agricultural enterprise profitability (Bashaasha *et al*., 2011).

According to Betz, (2009), extension worker often gravitate towards more capable and motivated farmers and information spill over between farmers. Farmers received information on new technologies and approaches through a variety of sources including formal extension, mass media, outlet such as radio or new papers, private companies and other farmers. This makes it difficult to estimate the impact of extension on output.

Previous studies have investigated the relationship between agribusiness extension and productivity with varying results. Birkhaeuser, Evenson, & Feder (1990) reviewed 26 studies using linear regression to determine relationship between extension contact and farm productivity, with only 11 statistically significant at 90% level.

Evenson (1997) points out that because of large variation in programme design and field worker, it is not feasible to make broad generalisations about economic contribution of agribusiness extension.

Agricultural and agribusiness extension in Uganda has evolved over time through transformation in to unstable service for several reasons (Semana, 2004). There was no policy on agricultural extension until establishment of NAADS, the transformation of extension did

not build on the strength of the past, they relied upon expert advice mainly foreign and more than local and dependence on donor funding.

Friis *et al., (*2004) argues that farming is a predominant occupation but farm income is still low, therefore studies need to be conducted to determine whether access to new technologies and markets are still key elements in reducing rural poverty. Poverty reduction initiatives hinge on yield, productivity and profitability of small holder farm enterprise.

In much of the world, agriculture faces the challenge of keeping pace with the rapidly increasing population and the few reserves of potentially cultivable land. Farmers will have to become more efficient and specialized, (Jones & Garforth, 2013). From government perspectives, whatever priority is given to production, extension will remain a key policy tool for promoting ecologically and socially sustainable farming practices (Jones & Garforth, 2013).

Some of the most promising recent developments in extension methodology have occurred where the key agenda is on participation in agribusiness extension advisory services by farmers. A consistent theme running through the innovative approaches being used, such as participatory rural appraisal is a fundamental change in what are the respective roles of extension agents and clients, (Chambers, 1993).

Since the scale at which extension support is required is thus often larger than the individual farm, extension workers need new skills of negotiation, conflict resolution, and the nurturing of emerging community organizations (Garforth, 1993; Smith, 1994) as cited in Jones & Garforth (2013).

The future of agribusiness extension service delivery is also likely to witness a reversal of recent trends towards bureaucratization within hierarchical extension services and a reduction in their levels of public funding. Moreover, a rapid increase can be expected in the use of

Information Communication Technology (ICT) in support of extension. The forces for change in these areas (Rivera & Gustafson, 1991) will come from four main directions; economic and policy climate, social context in rural areas, system knowledge and information technology (Jones & Garforth, 2013).

The findings from this study agree with most of the literatures. Study analysis and evidence also adds to the stock of literatures in agribusiness extension field especially in rice agribusiness value chain.

Methodology, procedures and instruments used for data collection and analysis to validate and support these literatures are presented in the proceeding chapter three in details.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter presents key methodological steps and procedures that were followed to conduct this study. Among the areas covered include; research design, study area, study population, sample size and selection, sampling techniques and procedures, data collection methods, data collection instruments, data management and analysis and measurement of variables.

3.2 Research Design

This study adopted a cross sectional correlation mixed-methods research design. The cross sectional design establishes extensively a single instance of a phenomenon of interest by use of small samples for detailed in-depth analysis. This minimizes time, cost and human resources constraints that could be incurred in conducting a country wide study.

Furthermore, the study employed a mixed-methods triangulation where both qualitative and quantitative approaches to data collection were used (Mugenda & Mugenda, 1999). In this method the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches in a single study" (Teddlie & Tashakkori, 2009). The quantitative research was the main method used in this study and qualitative method was used to supplement some additional relevant information to make the analysis and discussion more comprehensive.

3.3 Study Area

The study was conducted in Amolatar District (**Appendix VI**) which is located at the centre of Uganda, South of Lango sub region in the plains of Lake Kyoga. It is bordered by districts of Apac in the North, Dokolo in the North East, Kaberamiaido in the East, Kayunga,

Buyende and Mukono in the South, Luwero and Nakasongola in the South West and Kiriyandongo in the West.

Amolatar District comprises nine sub-counties and Two Town Councils making a total of eleven Lower Local Governments (LLGs), Fifty Eight parishes subdivided further into 435 villages/cells. It has a population of 146,904 with males 72,492 and female 74,412 (UBOS census provisional results, 2014).

All the above mentioned LLGs have benefited from the an extensive public agribusiness extension services delivery under NAADS programme which provided sample frame that could bring out clear and reliable result on impact of agribusiness extension support on smallholder rice farmers performances. Amolatar District is where NAADS rice agribusiness extension programme has been implemented for the last 14 years. In addition the researcher has good knowledge of the area of study.

3.4 Study Population

The population of the study were direct and indirect beneficiaries of NAADS rice agribusiness extension support. They were drawn from the following groups and communities; smallholder rice farmers' households that benefited from NAADS agribusiness extension support programme, technical staff like extension agents, Subs county NAADS coordinators (SNCs), Community Development Officers (CDOs), Subs county chiefs and Subject Matter Specialist(SMS at District level. Local community members, Chairperson Farmer's Forum (CFF), Community Base Facilitators (CBF), members of groups benefiting from the NAADS agribusiness extension programme drawn from three (3) sub counties of Agikdak, Etam and Namasale and Amolatar Town council in Amolatar District. In addition control group of non- NAADS agribusiness extension participating smallholder rice farmers who never received support from NAADS agribusiness interventions were also interviewed

for comparison. The unit of analysis in the study were sampled smallholder rice farmers households.

3.5 Sample size and sample selection

Krejcie & Morgan (1970) statistical table helped researcher to determine the appropriate sample size representing the population at a short glance (**Appendix V)** as recommended by Amin, (2005). Cooper and Schindler (2003) also argued that if the calculated sample size exceeds five percent of the population, the sample might be reduced without sacrificing precision. Meanwhile, Roscoe (1975) emphasized the types of research methods to determine the sample size. Roscoe stated a rule of thumb for determining the sample size for multivariate research, including multiple regression analysis where the sample size should be preferably 10 times or larger than the number of variables in the study (Krejcie & Morgan, 1970, Roscoe, 1975, Cooer & Schindler, 2003 quoted in Pant,(2009).

A sample of 220 respondents was determined by Krejcie & Morgan (1970) mathematical table (**appendix V**). The sample frame was obtained from authorities or technical heads of District and Sub counties selected. The individual elements in different categories sampled were determined using different sampling techniques as illustrated in **table 3.1** below. The objective was to allow for a representative sample, avoid bias and reduce sampling errors. (Kothari, 2003: Pant, 2009). In addition, two focus group discussions were conducted; one NAADS agribusiness extension supported beneficiaries and one non-NAADS agribusiness extension supported beneficiaries' smallholder farmers for comparison.

Table 3.1: Population Sample and Sampling Techniques

Category	Accessible Population	Sample size	Sample technique
Technical team and political leadership	36	32	Purposive sampling
NGO in agribusiness	5	5	Purposive sampling
NAADS supported small holder rice farmers	113	80	Simple random
Non-NAADS supported small holder rice farmers	65	51	Simple random
Leaders of agribusiness entities	64	52	Stratified Simple random
Total	283	220	

Source: *Amolatar District Local Government-Production & Marketing Department (July, 2014) and determined using Krejcie & Morgan (1970) as cited in Amin, (2005).*

3.6 Sampling techniques and procedure

The study used a sample size of 220 respondents which has been determined using the Krejcie & Morgan table (Amin, 2005) in **appendix v.** The researcher sampled the accessible population according to Mugenda and Mugenda, (1999). A list of sub counties, agribusiness entities, and smallholder rice farmers' households and farmers groups were obtained from the District production offices and used to randomly draw the samples based on the sample frame per Sub County of the different categories of respondents.

Purposive sampling techniques was used in qualitative study to chose respondents that were relevant, convenient and accessible to the researcher as indicated in the **Table 3.1 above**. The technique was used to identify and select respondents that were specific, had a lot of experience, and with in-depth knowledge and information on implementation rice agribusiness extension service delivery in Amolatar District.

Simple random sampling was used to get a representative sample from the study population during quantitative study. This approach was commendable for bringing out representative sample, eliminate sampling errors, avoid bias and allowing for comparison and generalization of results to a bigger population as recommended by Kothari (2003).

3.7 Data Collection Methods

The research employed both qualitative and quantitative methods of data collection. The data collection methods used for this study included researcher administered questionnaire, Interviews, Focus Group Discussion (FDG) and documentary analysis.

3.7.1 Questionnaire

The questionnaire method was used to collect quantitative data. Questionnaire covers a big area over a short period of time, (Kothari, 2003). It was standardised to avoid distortions of responses. The tool was brief, concise, and precise. Questionnaires were structured in plain English with closed and very few open ended questions to save time and allow for comparing responses of different groups as a deliberate effort to explore a substantive area and increase response rate. The questionnaires were used to collect data from larger respondents in all the three sub counties and one Town Council selected which make the results more dependable and reliable, (Amin, 2005).

3.7.2 Interview

Semi structure interviews approach was used to collect qualitative data. This method was used to collect sensitive personal information which was not possible to get using a questionnaire (Mugenda & Mugenda, 1999). The respondents were asked questions in order to find out what they do, think or feel to enable the researcher solicit information on subject under study through probing. This ensured that the study obtained views from diverse perspectives which according to Creswell (2001) enhanced the validity of qualitative results.

Interviews were researcher administered and responses were written down by researcher. It allowed the researcher to gather valid and reliable data that were relevant to research objectives and questions. Key Informant interviews were guided by check list that were specifically designed according to the category of respondents, research objectives and questions.

3.7.3 Focus group discussion

Focus Group Discussions were conducted in two sets one for NAADS agribusiness extension support direct beneficiaries and one for non-NAADS agribusiness extension support beneficiaries to allow for comparison. Each set of FDG consisted of maximum of eight members for detailed discussion and control by the researcher. The FDG guide was developed to make it more efficient and effective in obtaining the required information. The facilitators were oriented on the guide and issues for discussion initiated as per their scope in the study.

The main objectives of FGDs were to discuss the performance of rice enterprises and their challenges in the particular context, for instance, how the microenterprises are performing, what kind of rice enterprises were successful, and what the challenges were faced in the particular context of agribusiness extension. FDG also discussed the contextual rationale of certain quantitative findings like the kind of agribusiness extension support received by non-NAADS rice farmers.

3.7.4 Documentary review

Documentary review check list was developed to collect secondary data both quantitative and qualitative from a number of sources including: Amolatar District Local Government-Production & Marketing Reports (July, 2014), NAADS Guidelines, 2010), NAADS Guideline 2005, Amolatar District NAADS Review and Monitoring Report (2014), Amolatar

District DP (2013), NAAD-ATAAS Implementation Guidelines 2010 and National Rice Development Strategy (NRDS, 2008-2018)

3.8 Data Collection Instruments

A number of collections instruments were employed to obtain data from the field. These included researcher administered questionnaires, interview guides, Focus Group Discussion (FDG) guide and documentary review checklists as detailed below.

3.8.1 Researcher administered questionnaire

This was effective in obtaining specific quantitative information within a minimal timeframe. Questionnaire is used for collecting large set of quantitative data from wider geographical coverage. It was standardized to avoid distortion of responses. It was precise, concise and structured questions in simple English. It has both closed and few open ended questions to save time (**Appendix I**).

3.8.2 Interview guide

One-to-one interview guide with open-ended questions was used to collect qualitative data. It allowed respondents to focus on the issues of greatest importance to them (Barbour, 2008). It helped researcher to obtain detailed information about how an individual thinks, feels, or perceives a particular phenomenon of interest. Interview was used to collect data from categories of respondents with different perspectives on the topic of study because of the different roles that they play in the agribusiness extension support project implementation like key informants (**Appendix II**). Interviews allowed probing for details on the subject to eliminate bias, incorrect answers, limited anonymity, and for sensitive respondents. Ethical standards and conduct was adhered to in order to ensure privacy, anonymity and confidentiality.

In this study, the interviews were conducted by the researcher himself with rice farmer's leaderships and agribusiness extension program facilitators such as coordinators and or chairpersons and/or the staff of the District Production Office.

The main objective was to explore the contextual rationale of certain quantitative findings of the study. The information obtained from the interviews was used to supplement the discussion of the quantitative results with a qualitative explanation and considering their relevance to the reality on the ground.

3.8.3 Focus Group Discussion guide

There were two Focus Group Discussions conducted, one for direct NAADS agribusiness extension beneficiaries and one for non-NAADS beneficiaries group. The members were maximum eight and included group leaders, opinion leaders, male, female, youth .people with disability to allow effective representation of views and comprehensive discussion. This was used due to its ability to capture many responses from many respondents and in a short time. It reinforced and validated information collected quantitatively (**Appendix III**).

3.8.4 Documentary review check list

Documentary review involved the researcher checking and analysing the existing programme /activity documents regarding agribusiness extension support to smallholder farmers. This was vital in providing background information and facts about agribusiness extension support implemented by the public and private organizations before primary data collection. Some of the documents that were reviewed include: Amolatar District Local Government-Production & Marketing Report (July, 2014), NAADS Guidelines, (2010), NAADS Guideline (2005), Amolatar District NAADS Review and Monitoring Report (2014), Amolatar District DP (2013), NAAD-ATAAS Implementation Guidelines (2010) and National Rice Development Strategy (NRDS, 2008-2018) (**Appendix IV).**

3.9 Reliability and Validity

These tests were done on study instruments to ensure quality control

3.9.1 Reliability

To ensure that the measuring instrument measures what is supposed to measure, a test for reliability of instrument was done (Crocker & Alinga, 1986 as cited in Golafshani (2005). Mugenda & Mugenda (1999) defines reliability as the degree to which the research instruments yield stable results after repeated trials. Pretesting using test-retest method was done on 20 respondents in Agwata Sub County, Dokolo District randomly sampled non targeted respondents and subjected to questionnaires and re-subjected again to smallholder rice farmers in Awelo Sub County in Amolatar district with 2 groups of 10 farmers within the study population but outside the sample that participated in the study.

Data from the test scores on every item were obtained per set within the group for the ten sets of questionnaires and results were analysed. The results of the reliability analysis adopted internal consistency technique (**Cronbach Alpha Technique**) to determine the reliability of the instruments as presented in **table 3.2** below.

Table 3.2 : Reliability results

Variables	Alpha score	Number of items
Advisory services support	.642	21
Technology support	.740	8
Farmer institutional development supports	.531	6
Income, productivity and Profitability	.813	7
Total	2.726	

Source: primary data

Table 3.2 above shows that the reliability score of 0.7 (2.726/4) was obtained from the key variables. The score is above the 0.5 as recommended by Amin (2005) who argues that for an instrument to be reliable, its reliability score should be above 0.5 and it was concluded the instruments were reliable.

For the qualitative study, reliability was ensured through **communicative validation** of the interview guide. The researcher pre-tested the instrument on non targeted respondents in Agwingiri Sub County. Six farmers were chosen and interviewed. Each one of them gave a feed back as regards the relevancy and accuracy of questions asked. The researcher discussed the feedback with experts and supervisors and necessary changes were made on the interview guide to ensure reliability according to Sarantakos, (2005).

3.9.2 Validity

Validity refers to the extent to which the results obtained from the analysis of the data actually represent the phenomena under study (Pant, 2009). It determines the correctness and truthfulness of the research results. Validity maximise trustworthiness, rigor and quality of research process to reinforce research outcomes or results (Golafshani, 2003).

Validity of the research instrument was established using **Content Validity Index (CVI)** to determine the relevance of the questions in measuring the variables. Two research experts (Supervisors) were used to scrutinize valid and invalid questions to determine validity of the instruments by scrutinizing drafted questionnaires to evaluate the relevancy of each item on a scale of four; very relevant-4, quite relevant-3, somewhat relevant-2, Not relevant-1. The Content Validity Index **(CVI)** was calculated by dividing the number of item rated 3 or 4 from both experts to the total number of items on the questionnaires.

$$\text{CVI} = \frac{\text{Number of item rated 3 or 4 by both experts}}{\text{Total number of items on the questionnaires.}}$$

$$\text{CVI} = \frac{40/42 + 39/42}{42} = \frac{39.5}{42} = \mathbf{0.94}$$

The total two scores from both experts were 40 and 39 out of 42 items in the questionnaires. The two scores gave an average of 39.5 out of 42 items in the questionnaires. This gave CVI of 0.94 which according to Amin (2005) is more than 0.7. Therefore CVI of **0.94** qualified

the instrument to be valid. From the assessment by research experts, adjustments and changes were made on the final questionnaires accordingly before printing for distribution and data collection.

3.10 Data Collection Procedures

After approval of research proposal by UMI, the researcher was given an introductory letter from UMI School of Management Sciences to go for data collection in the field (**Appendix IX**). Research resources were organized, data collection instruments approved. Pilot test done to ensure it captures the actual data as per research objectives and questions.

Four research assistants were identified and trained to assist in data collection process. They were 2 former Sub county NAADS Coordinators (SNCs) and 2 Community Development Officers (CDOs). Before actual data collection; one day training was conducted for research assistants. The training covered the following topics; Briefing and discussions on the research, its objectives and expectation of the research, explanation of all questions in the questionnaires, ethical consideration and quality assurance of data collected. Sensitisation on the procedure for interview before filling the questionnaires, facilitation and logistical issues were also discussed.

Before the actual survey was conducted, a pre-survey visit was arranged to the district and sub counties for the researcher and survey team to acclimatize to the area, meets local council leaders and technical team. Systematically, the researcher scheduled for appointments with key informants for interview and set off to the field.

3.11 Data Management and Analysis

3.11.1 Qualitative Data Analysis

Qualitative methods refer to "The techniques associated with the gathering, analysis, interpretation, and presentation of narrative information" (Teddlie & Tashakkori, 2009). It is guided by the constructivist paradigm, which suggests that "researchers individually and collectively construct the meaning of the phenomena under investigation" (Teddlie & Tashakkori, 2009).

The qualitative research method focuses on processes, understanding, and beliefs. This method fits best the exploration of detailed information on the phenomenon of interest. In the context of this study, the qualitative findings have been used only to supplement the quantitative results with more detailed qualitative information and evidence, thus linking the quantitative results to the context.

The interview data was presented inform of quotations which were recorded verbatim. This was done by linking theory and analysis of pattern, frequency, magnitude, structures, processes, causes and consequences of a phenomenon to logically draw meaning out of the data.

Variable Oriented Analysis was done to describe and explain the interrelationships of a particular independent and dependent variable and linking them to concepts to achieve overall explanation. This was achieved through data organisation, reading interview notes, creating categories, themes and pattern of study subjects, interpreting information to evaluate and analyse the data to determine the frequencies of information, credibility, usefulness, consistency and validation or non-validation of hypothesis.

The qualitative analysis techniques were complemented with some statistics that were mainly obtained from the secondary data from documentary analysis from Amolatar District and farmer organizations.

3.11.2 Quantitative Data Analysis

This was done using SPSS computer programme. After data collection, a systematic sequence of data preparation which involved checking, editing and coding. Data entry to SPSS, data processing and analysis, presentation in tables, interpretation of finding and conclusion were done.

Descriptive statistics mainly means and percentages were used to describe the characteristics of respondents such as gender, education and income of household heads and farming characteristics in accordance with the variables under investigation. These include access to NAADS agribusiness extension advisory services, access to agribusiness technologies and membership to NAADS groups. In addition, inferential statistics particularly Analysis of Variance (**ANOVA**) was used to compare mean yields, profits and incomes across the different groups of farmers. The comparisons made are; farmers who accessed NAADS agribusiness extension advisory services; those who accessed agribusiness technologies and those who belonged to farmer groups versus those who did not otherwise.

The ANOVA model equation was specified as follows:

$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_t$

Where:

Y = the dependent variable representing the level of productivity of farmers

a = Intercept (constant) term.

X_1 to X_4 = Independent variables

e_t = Random error term.

β_1 to β_4 = regression coefficients for independent variables.

3.12 Measurement of variables

An operational definition refers to the operationalization of a concept. It provides a clear and detailed measure of the variable. (Hair *et al*., 2010). It describes exactly how the variables were measured in a particular study. In quantitative research, the variables must be operationalized in order to obtain the data.

A construct is an "abstract idea, underlying theme, or subject matter that one wishes to measure using survey questions" (Lavrakas, 2008). The constructs are also known as latent variables. They are measured using a certain set of questions, which are also called manifest or observed variables. In this study, the items used to measure each construct were taken from the review of the related literature or widely known studies.

A description and measures of the dependent and independent variables that were fitted in the model is provided in table below:

Table3. 3 :Variable definition and measurement

Variable	Definition	Measurement
Dependent variable: Farm productivity	The extent to which farmers obtain high output, profits and income from sell of crop output	Yield per acre of rice, profitability and income realized per acre of rice for every farmer interviewed.
Independent variables		
Access to agricultural advisory services	Farmer who were trained by NAADS in agronomic practices and applied the practices	Dummy variable (1=farmer had access, 0=farmer never accessed
Access to input technologies	Farmer who received and used NAADS technology inputs such as improved seed, fertilizers to enhance productivity	Dummy variable (1=farmer had access, 0=farmer never accessed
Access to Farmer institutional Development support	Farmer producing and marketing as a group	Dummy variable (1=Yes,0=No)
Farm Enterprise Performance	Farm enterprise performance is one of the main dependent variable of the study. It refers to the multidimensional measures of the enterprise performance in terms of profit growth, productivity (yield) in Kg and Incomes in Ug.sh	
Smallholder Farmers Related Factors	Smallholder -related factors refer to gender, age, educational attainment, and experience, managerial skills, needed for the management of farm enterprises. Age refers to the current age (in years) of the smallholder farmers. Educational attainment refers to the level of education completed (in years) by the small holder farmer.	

Source: primary data

3.13 Ethical Consideration

The researcher strove to ensure that the work will make a positive contribution to the welfare of those affected by the research problem. The research methods did not cause harm to the participants and respected the rights and dignity of the participants. Most of the aspects of the research involved primary data collection in the form of interviews. The researcher ensured that the legal requirements regarding collection, storage, handling, processing and

analysis of data was complied with including; participants in sample surveys and related data collection exercises were given full and accurate information in regard to issues such as the background, nature, purpose, funders and outputs of the research.

In pursuing compliance, the participants in sample surveys and related data collection exercises were given sufficient details on the research in question as to allow them to make an informed decision to participate in the research study. My work also safeguarded the interests of the vulnerable, especially the elderly and women. Participants in the sample surveys and related data collection exercises had the right not only to agree to participate in the research but also to decide on which information to provide as part of the research and to withdraw from the research at any time.

The information provided by participants was treated as confidential and used for this research purposes only. Other information will not be disclosed in any fashion to third parties which would allow it to be associated with an identifiable individual, unless this is clearly stated by a particular participant while he or she was recruited into the research.

CHAPTER FOUR

4.0 PRESENTATION, ANALYSIS AND INTEPRETATION OF RESULTS

4.1 Introduction

This chapter presents analysis and interpretation of the results. First, the chapter presents the response rate, the distribution of farmers by socio-economic characteristics as well as the descriptive statistics of farmers by access to NAADS advisory services, access to agribusiness technologies and farmer institutional development or membership to NAADS farmer groups. The chapter then presents ANOVA results comparing productivity, profitability and income of farmers between beneficiaries and non-beneficiaries of NAADS agribusiness support in accordance with the study objectives.

4.2 Response rate

This study targeted a sample of 220 respondents. However, the actual number of respondents reached was 174 due to non-response and inaccessibility of some respondent on repeated trails shown in the table below.

Table 4. 1: Response rate

Category	Planned	Actual	Percentage response
Technical team and political leadership	32	32	100%
NGO in agribusiness	5	2	40%
NAADS supported small holder rice farmers	80	80	100%
Non-NAADS supported small holder rice farmers	51	40	78%
Leaders of agribusiness entities	52	20	38%
Total	**220**	**174**	**79%**

Source: primary data

Results obtained and presented in Table 4.1 above revealed an overall response rate of 79% which falls above the 50% threshold recommended for a sample to be representative of the population (Amin, 2005). NGO in agribusiness and Leaders of agribusiness entities had low response of 40% and 38% respectively due to difficulty in accessing their managers who were out of the district on work related and business assignments. The response rate of 79% was quite adequate to conduct analysis of the data in this study. After data cleaning and coding, 31 quantitative questionnaires were dropped due to incomplete recording and missing data. The quantitative analysis therefore utilized 100 questionnaires.

4.3 Description of farmers by socio-economic characteristics

This section presents percentage distribution of farmers by sex, age, education, marital status, membership to farmer organisation, membership to NAADS groups; land holding was obtained to understand the characteristics of the study sample of farmers and their farming activities. The objective was to ascertain whether the sample size was representative of the study population which would enhance validity of results so as to generate valid inferences. Results to this end are presented in the **Table 4.2** below.

Table 4. 2 : Description of farmers by socio-economic characteristics

Variable	Percentage of respondents
Gender (n=)	
Male	59 %
Female	41 %
Age:(n=)	
Youth (18-30)	18 %
Adults (31-50)	78 %
Aged (51 and above	4 %
Education level:	
Primary	26 %
Secondary	48 %
Tertiary	17 %
Non	9%
Marital Status:	
Married	59 %
Single	22 %
Divorced	11 %
Widowed	8 %
Sources of Advisory Services:	
NAADS Only	49 %
NAADS and other Sources	27 %
Other Sources	24 %
Description	Characteristic
Average age of respondents	41 Years
Minimum age of Respondents	22years
Maximum age	73 Years
Land Ownership in Acres:	
Under 0.4	1.67%
0.4-1.00	15.56%
1.1-2.00	57.78%
2.1-3.00	25%
Primary Economic engagements of household heads:	
Crop Production(48 Male and 19 Female)	37%
Livestock Rearing(26 Males and 9 Females)	19%
Mixed Farming(48 males and 20 Females)	38%
Other(2male and 4 females)	6%

Source: Primary data

Table 4.2 above, present gender distribution of respondents which indicated a significantly high proportion of male than female respondents from whom data was gathered. This can be attributed to the fact that the study was conducted in households targeting heads who are more likely to be male than females. The findings show that all age categories found in the population were represented in the sample. The results also revealed that the majority of respondents were in middle aged group with experience in farming and in their productive age to engage in active agribusinesses.

Many respondents had attained primary and secondary education. Education levels determine respondents' ability to interpret and answer questions during interviews. This further indicates that respondents were able to attend NAADS trainings, understand, utilize and apply agronomic practices and technologies that they were supported with under NAADS.

Respondents cut across varying marital status and **Table 4.2** above revealed the results obtained on the marital status of the respondents. Looking at the distribution, it showed that the majority were married. Other categories have also been indicated passing the sample as fairly selected in terms of marital status.

Results in the Table 4.2 above further revealed that majority of respondent were in crop production. Farmers produce different types of grains but they are mainly engaged in the production of cereals (mainly rice, and maize), pulse crops (peas and beans), oil crops (mainly sunflower), horticultural crops (mainly potato, onion, tomato, carrot, Pepper and cabbage). Most of the economic activities are dominated by male gender as shown in the Table 4.2 above.

A look at family size revealed that 70% of respondents from the study area have family members of four to nine with average of eight members. This is similar with the national statistics of 7 members (UBOS census provisional results, 2O14). Considering land holding

size and ownership, on average farmers owned three hectares of land. The majority of the households (58%) own between one and two hectares.

4.4. Descriptive statistics of access to agribusiness extension support and performance of smallholder rice farmers.

In light of the study objectives to establish the extent to which access to agribusiness extension support influence performance of smallholder rice farmers in Amolatar District. Data captured included access to training on agronomic practices, access to post harvest handling facilities, access to market information and linkages, access to improved seeds and access to Farmer Institutional Development (FID) support in farmer groups.

Table 4. 3 : Access to agribusiness advisory services, technology and FID support by NAADS and Non NAADS small holder rice farmers

Variable(n=1)	Percentage of Respondents	
	Yes	**No**
Use of Improved Seeds:		
NAADS members	63.6%	36.4%
Non-NAADS members	68.2%	31.8%
Access to Advisory Services		
NAADS members	83.3%	16.7%
Non-NAADS members	35.7%	64.3%
Sources of Advisory Services		
NAADS only	49%	51%
NAADS and other Sources	27%	73%
Other Sources Only	24%	76%
Membership to a farmers group	60%	40%
Farmer group affiliation to NAADS	39.1%	60.9%

Source: primary

Results presented in table 4.3 above revealed that majority of farmers access improved seeds under NAADS (63.6%). However, there was a significant usage of improved seeds amongst

the non NAADS beneficiaries, at 68.2%. This was attributed to other sources of seed and purchases of seeds from NAADS group by non NAADS members.

83.3 % of the NAADS members had access to agricultural advisory services. As to whether the member of the household who attended training equally represented by Gender, 60% confirmed that there was gender representation while 40% said no. This has implications on implementation of improved agronomic practices. Furthermore, 58% expressed dissatisfaction with NAADS training. This was confirmed during the focus group discussion session that "*the methods and strategies of training delivery were boring, time consuming and not attractive to the clients*".

This finding was reinforced with qualitative data from key informant interview that "*according to NAADS implementation guidelines all farmers were free to attend training whether you are in NAADS group or not and due to spill over effect where farmers get training information from other fellow farmers and other sources like NGO and private companies, for instance Mukwano group*".

The majority of non-NAADS members rarely attend trainings. There was no significant difference between NAADS farmers marketing in groups and non NAADS group's members due to price differences in the different markets where farmers are selling at same prices. The amount of difference between expected and actual data was likely just due to chance. The sample does not support the hypothesis of a difference. However, there was a significant different between those who access training and those who do not access training.

NAADS was the major source of production and market information at 49% while NGOs and other service provider also providing 30% of information farmer are utilising in agribusiness.

There was a significant difference between the members and non NAADS members in accessing agricultural advisory services. The studied sample supports the hypothesis of a

difference. There was a positive significant influence between access to agribusiness advisory services and performance of smallholder rice farmers which support research hypothesis one and reject the null hypothesis.

4.5. Agribusiness extension support and performance of smallholder rice farmers

This section presents ANOVA results on agribusiness support that tested significance of mean productivity, profitability and incomes between farmers who accessed NAADS agribusiness extension support and those who did not otherwise. The presentation is structured is three subsections (4.5.1- 4.5.3) reflecting the three dimensions of agribusiness extension support namely agribusiness advisory services, technology support and Farmer Institutional development as also indicated in the objectives of the study.

4.5.1. Access to agribusiness advisory services and performance of smallholder rice farmers.

The analysis established ANOVA results comparing performance of rice enterprises between beneficiaries and non-beneficiaries of NAADS advisory services across productivity, profitability and income aspects. Results are presented in Table 4.4.

Table 4. 4 : Productivity, profitability and income between beneficiaries and non-beneficiaries of NAADS advisory services

Variable	F-statistic	p-value
Productivity	9.143*	0.003
Profitability	4.857*	0.03
Income	12.147**	0.001

* indicates statistic significant at 5% significant level

The F-statistics in respect to productivity, profitability and income were all statistically significant at 5% significance level. This indicates a significant difference between

productivity, profitability and income between beneficiaries and non-beneficiaries of NAADS accessing advisory services (Table 4.4).

In light of this result, the analysis further estimated and compared the average income, productivity, and profitability of beneficiaries and non-beneficiaries from the NAADS advisory services (Table 4.5).

Table 4.5 : Estimated yield, profits and incomes between beneficiaries and non-beneficiaries of NAADS advisory services

Variable	Estimated income		f-statistic	Sig(p-value)
	NAADS beneficiary farmers	Non-NAADS beneficiary farmers		
Productivity (Kgs /acre)	706.37	495.50	12.983**	0.001
Profitability (UGX per acre)	518,840	344,586.7	4.857	0.030
Income (UGX per acre)	954,024	710,740	12.147**	0.001

The p-values in respect to the productivity, profitability and income coefficients were less than 5% significance level indicating that significant differences existed in productivity, profitability and incomes between beneficiaries of advisory services and non-beneficiaries.

Specifically, the yield per acre amongst the NAADS beneficiaries was at 29.9 % (210.87kg/acre) significantly higher than that of the non-NAADS beneficiaries (495.50kg/acre).

In terms of profitability, beneficiaries of NAADS advisory services registered higher profits (UGX 518,840 per acre) compared to non-beneficiaries from NAADS advisory services (UGX 344,586 per acre). This indicates a difference of 33.6 % (243,284 UGX per acre) between NAADS and non NAADS beneficiaries.

Regarding income, non NAADS supported farmers earned significantly less income (UGX 710,740) than NAADS supported beneficiaries (UGX 954,024) revealing the difference of 25.5 % (174,254 UGX per acre).

4.5.2 Access to agribusiness technologies influence on performance of smallholder rice farmers.

The analysis further established the extent to which access to agribusiness technologies influence performance of small holder rice farmers in Amolatar District. Focus was on farmers' access to improved seeds on the premise of increasing productivity, profitability and incomes. Table 4.6 presented the ANOVA results for this comparison.

Table 4. 6: Productivity, profitability and income of smallholder rice farmers' comparison between beneficiaries and non-beneficiaries of NAADS Agribusiness technologies

Variable	F-statistic	p-value
Productivity	12.983**	0.001
Profitability	2.191	0.143
Income	6.130*	0.016

* indicates statistic significant at 5% significant level

The F-statistics in respect to rice production productivity and income were statistically significant ($p < 0.05$) indicating a statistically significant difference in productivity and incomes between beneficiaries and non-beneficiaries of NAADS technologies (Table 4.6).

In contrast, the F-statistic for comparison of profitability between beneficiaries and non-beneficiaries of NAADS technologies was not statistically significant (p>0.05) indicating no difference in profitability between the two groups of farmers. The insignificance in differences was attributed to price differences. It is likely that farmers who never benefited from technologies could sell their output at a better price provided they got a better buyer and negotiated well in the market. Consequently they would get higher profits than even those who benefited from NAADS technologies but sold at a slightly lower price.

In light of the above results, the analysis further estimated and compared the average productivity, profitability and incomes of beneficiaries and non-beneficiaries from the NAADS technology supports. Results are presented in Table. 4.7.

Table 4.7: Estimated yield, profits and incomes of beneficiaries and non- beneficiaries of NAADS technologies

Variable	Estimated income		t-statistic	Sig. (p-value)
	NAADS beneficiary farmers	Non-NAADS beneficiary farmers		
Productivity (Kgs/acre)	682	440	12.983	0.001
Profitability (UGX per acre)	476,784	343,644	2.191	0.143
Income (UGX per acre)	911,150	718,438	6.130	0.016

The p-values in respect to the productivity, profitability and income coefficients were less than 5% significance level indicating that significant differences existed in productivity, profitability and incomes between beneficiaries and non-beneficiaries of NAADS agribusiness technologies.

Specifically, the yield per acre amongst beneficiaries of NAADS technologies was at 35.5% (242Kg/acre), significantly higher than that of farmers who never benefited from NAADS (440.77 Kg/acre)

In terms of profitability, beneficiaries from NAADS technologies registered UGX 476,784 which was insignificantly higher than UGX 343,644 per acre realized by the non-beneficiaries from NAADS technologies. The difference is by 27.9 % (133,140 UGX per acre) between those who accessed NAADS technology support under NAADS and non NAADS supported farmers.

Regarding income, non NAADS supported farmers earned significantly less income (UGX 718, 438) than NAADS supported beneficiaries (UGX 911,150). The differences are by 21.2 % (192,712 UGX per acre).

From key informants interview negligible numbers of rice farmers were using soil enhancing inputs due to good soil and yield performance. One respondent in Amolatar district quoted; *"yield increase in rice production in Amolatar District has been due to increases in acreages planted, good soil and new rice variety-NERICA series not use of fertiliser. Farmers are unable to buy the fertilizers because of the high cost of acquiring. NAADS has focused on providing improved seed to enhance productivity. Technologies for agro processing and value addition remain limited."*

Similarly, from FDG it was revealed that *"there were limited uses of tractors for land opening and there were only three tractors in the whole district with high cost of hire that smallholder farmers cannot afford"*. However, it was reported that few farmers were using oxen acquired from projects such as NAADS, NUSAF and Restocking programmes.

In the same vein, storage facilities were reported lacking and from FDG "*few stores that used to belong to primary cooperative societies were dilapidated, obsolete, no leadership and structures and can no longer support group bulking and marketing of farmers produce*".

4.5.3 Access to FID support influence on performance of smallholder rice farmers.

The analysis further established the extent to which Farmer Institutional Development (FID) support influences performance of smallholder rice farmers in Amolatar District.

FID support encompass assisting farmers to form and join farming groups from where they would access support and work together to improve productivity, profitability and income. Taking a proxy of membership to farmer group, Table 4.8 below presents ANOVA results comparing productivity, profitability and incomes between beneficiaries and non-beneficiaries of NAADS FID support.

Table 4.8: Productivity, profitability and income of small holder rice farmers' comparison between members and non- members of NAADS

Variable	F-statistic	p-value
Productivity	12.068*	0.001
Profitability	0.142	0.707
Income	3.364	0.070

* indicates statistic significant at 5% significant level

The F-statistics in respect to rice productivity, profitability and income were statistically significant (p<0.05) indicating a statistically significant difference in productivity and incomes between members and non-beneficiaries to NAADS groups (Table 4.8).

In contrast, the F-statistic for comparison of profitability between members and non-members of NAADS groups was not statistically significant (p>0.05) indicating no difference in profitability between the two groups of farmers. The insignificance in differences was also

attributed to price differences. It is likely that farmers who do not belonged to NAADS groups could sell their output at even a better price provided they got a better buyer and negotiated well in the market. Consequently they would fetch higher profits than even those who belonged to NAADS groups but sold at a slightly lower price. The null hypothesis was therefore upheld and the research hypothesis was rejected since there was no difference in profitability between the two groups.

The analysis further estimated and compared the average productivity, profitability and incomes of beneficiaries and non-beneficiaries from the NAADS FID support. Results are presented in Table 4.9.

Table 4.9: Estimated yield, profits and rice incomes members and non- beneficiaries of NAADS farmer groups

Variable	Estimated income		f-statistic	Sig.(p-value)
	NAADS beneficiary farmers	Non-NAADS beneficiary farmers		
Productivity	712	472	12.068	0.001
Profitability	507,961	343,480	4.188	0.043
Income	953,290	693,480	3.364	0.007

Source: Field data

The p-values in respect to the productivity, profitability and income coefficients were less than 5% significance level indicating that significant differences existed in productivity, profitability and incomes between members and non-members of NAADS farmer groups.

Specifically, the yield per acre amongst farmers who belonged to NAADS groups was 33.7 % (240 Kg/acre), significantly higher than that of farmers who never belonged to farmer groups (472 Kg/acre). In terms of profitability, farmers who belonged to NAADS groups registered UGX 507,961 significantly higher than UGX 343,480 per acre realized by the non-members

of NAADS farmer groups. The result reveals profit difference of 32.4 % (164,481 UGX per acre) between farmers belonging to NAADS groups and non NAADS members.

Regarding income, farmers who belonged to NAADS groups earned significantly higher income (UGX 953, 290) than that of farmers who never belonged to NAADS groups (UGX 693, 480). This indicates a difference of 27.3% (259,810 UGX per acre.

Evidence obtained from one member of the FGDs revealed that "*NAADS were revolving their services to only specific groups' year in and year out resulting into frustration and resentment from joining NAADS group hence other farmers were not seeing benefits and felt isolated*".

CHAPTER FIVE

5.0 SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, discussion, conclusion and recommendations. It also presents implications of the findings, scientific contribution of the study, and suggests areas for further study. The summary, discussion of the findings, conclusion and recommendations are presented objective by objective in the proceeding sections.

5.2 Summary

The purpose of this study was to establish the influence of agribusiness extension support on performance of smallholder rice farmers in Amolatar District.

Agribusiness extension support was conceived as independent variables while performance of smallholder rice farmers was dependent variable. This study set out to; establish the extent to which access to agribusiness advisory services, agribusiness technologies and farmer institutional development support influence performance of smallholder rice farmers in Amolatar district. The study employed a cross sectional research designed and triangulated with both quantitative and qualitative approaches for collection and analysis of data from a sample of 174 respondents. The summary of the findings in respect to the study objectives are presented in the subsections 5.2.1 to 5.2.3.

5.2.1 Access to agribusiness advisory services and performance of smallholder rice farmers.

Results revealed a significant difference in productivity, profitability and incomes between beneficiaries and non-beneficiaries of NAADS beneficiaries accessing advisory services. Beneficiaries of NAADS advisory services earned a significantly higher yields (29.9 %),

profits (33.6%) and incomes (25.5%) than non-beneficiaries from NAADS advisory services. These results were based on comparison of 83.3% of rice farmers who accessed agribusiness advisory services from NAADS and 64.3% of the Non-NAADS members who never had access to agricultural advisory services.

5.2.2 Access to agribusiness technologies support and performance of smallholder rice farmers.

Results revealed a statistically significant difference in productivity of 35.5 % and incomes of 21.2% between beneficiaries and non-beneficiaries of NAADS technologies. The difference in profitability between beneficiaries and non-beneficiaries of NAADS technologies was not statistically significant though it was at 27.9 % due to price differences depending on market accessed. Farmers who accessed NAADS technologies realized significantly higher yields (35.5%) and incomes (21.2%) than those who never benefited from NAADS.

5.3.3 Access to FID support and performance of smallholder rice farmers.

Results revealed a significant difference in productivity, profitability between members of NAADS farmer groups and non-members. Members of NAADS farmer realized significantly higher yields (41.3%), profitability of 32.4 % and earned significantly higher incomes (27.3%) than non-members. These results were based on comparison of rice farmers who belonged to NAADS farmer groups and those who never belonged to any farmer groups.

Regarding profitability, no significant differences were observed between the two groups of farmers. This can be attributed to the fact that the majority of farmers (86%) in both categories of groups sold their produce individually. This implied that belonging in a farmer group could not guarantee accessing a better price for the output which could create a difference in terms of profitability.

5.3 Discussion

The discussion of the findings of the study is presented according to objectives as below.

An overview presented hereunder indicates that increasing agricultural productivity is a major challenge in Sub-Saharan Africa (SSA), where 62% of the population (excluding South Africa) depends on agriculture for their livelihoods (Staatz & Dembele, 2007). Improving the productivity, profitability and incomes sustainability of smallholder farmers was the main pathway to get out of poverty (World Development Report [WDR], 2008).

The performance of the smallholder farmers is dependent upon their access to productive resources (land, labour, technology, capital and productive assets) and their knowledge to use those resources effectively and sustainably and while the importance of non-agricultural activities is increasing in rural areas, smallholder agricultural technology development still holds the greatest potential for poverty reduction (IFAD 2002a).

There is relatively large literature dealing with issues related to agricultural extension like adoption status of improved agricultural technologies (Feleke & Zegeye, 2006; Darcon & Christiaensen, 2007; Gebregziabher & Holden, 2011; Beshir, Emana, Kassa, & Haji, 2012) among others. Although these studies provided useful information on the rate of adoption and factors influencing adoption, rigorous impact evaluations of agricultural extension interventions are scanty (Anderson & Feder, 2007; Gebremedhin *et al*., 2009; Nega *et al.*, 2010; World Bank, 2010).

Therefore, this study aim was to establish the influences of access to agribusiness advisory services, agribusiness technologies and farmer institutional development support as components of agribusiness extension program on smallholders' farm productivity, profitability and incomes.

The conceptual framework illustrates how agribusiness extension program is used to enhance farmers' knowledge and skills, as well as promote and expand improved technologies affect farm productivity, profitability and income of smallholder rice farmers of Amolatar District.

The discussion of the findings of the study was done objectives by objectives as presented below.

5.3.1 Access to agribusiness advisory services and performance of smallholder rice farmers.

The study findings revealed there is a statistically significant difference on the mean yields of 29.9 % and incomes of 25.5% most likely due to the advisory services received. This finding is in agreement with NAADS Guidelines (2005), which stipulates that advisory services should focus on increasing agricultural production, incomes, introduce appropriate technologies, stimulate on-farm employment, facilitate formation and strengthening farmer organizations, developing new market linkages, providing social services and conserving environment.

However, on the contrary, agribusiness sector remains a low-input, low-output activity with high levels of transaction costs, post-harvest losses and therefore, low-level of agricultural enterprise profitability as indicated by insignificant level of profitability. This finding agree with Bashaasha, (2011) who argues that low profitability of enterprise are due to low prices, poor markets and market dynamics.

According to Feder *et al.*, (2004), Extension can contribute to increasing the speed of technology transfer, increasing farmers' knowledge and assisting them in improving farm management practices.

Agribusiness extension advisory services influence the profitability of the rice enterprise in close agreement according to Anderson & Feder (2003) that productivity improvements are

only possible when there is a gap between actual and potential productivity. They suggested two types of 'gaps' that contribute to the productivity differential, the technology gap and the management gap.

The positive and statistically significant influence of extension access underscores the important role played by agribusiness advisory services in increasing production and productivity in farming systems in the country. Any government's commitment to developing a viable and efficient agribusiness extension system starts with development of human capital to extension advice and services to farmers as noted Nygaard *et al*., (1997). This is in agreement with many studies in Africa that show positive impacts of extension contact (Owen *et al*, 2001; Ragasa *et al.,* 2012; Hasan *et al.*, 2013).

Evenson (1997) also points out that because of large variation in programme design and field worker, it is not feasible to make broad generalisations about economic contribution of agribusiness extension. This finding is confirmed by Kjaer *et al.*, (2013) in a study in Uganda, that despite several major reforms programmes in agriculture and agribusiness in particular, National Agricultural Advisory Services remain next to non-existent. In Uganda, there are only 1500 extension workers in the entire country and much less with the dissolution of NAADS (MAAIF, 2014).

There is agreement among experts and politicians that improving agribusiness extension advisory service is a necessary element in poverty reduction and a structural transformation of the economy, despite this, results on the ground remain wanting as shown by the study findings and supported by Badiane, (2010).

Agricultural and agribusiness extension in Uganda has evolved over time through transformation into unstable service for several reasons (Semana, 2004). Rivera *et al*., (2000) argued that the pressures on extension performance is calling for changes in traditional public

extension systems which are now seen as outdated, top down, paternalistic, inflexible, subject to bureaucratic inefficiencies and therefore less able to cope with the dynamic demands of modern day agribusinesses.

The finding revealed that profitability of NAADS supported farmers is higher at 33.6 % compared to non NAADS supported farmers. The differences between some of the means are statistically significant. Therefore agribusiness extension services influences the profitability of the rice enterprise. This finding according to Betz, (2009), is a result of extension worker often gravitating towards more capable and motivated farmers and information spill over between farmers. Farmers received information on new technologies and approaches through a variety of sources including formal extension, mass media, outlet such as radio or newspapers, private companies and other farmers. This makes it difficult to estimate the impact of extension on output.

The study findings for objective one also indicate that there is a significant difference between the NAADS members and non NAADS members in accessing agricultural advisory services. Therefore, government efforts to ensure that the majority of agricultural farmers are in direct contact with extension agents should be supported so as to improve and transform agricultural households in Uganda. The results from crop productivity estimates show that extension visit variable is positive and significant.

5.3.2 Access to agribusiness technologies and performance of smallholder rice farmers.

From the findings, it is realized that the use of improved seeds is nearly evenly distributed amongst NAADS (63.6%) and non NAADS supported farmers with more of the non-beneficiaries (68.2%) used improved seeds. This study is in agreement with the wide spread argument that, achieving agricultural productivity growth will not be possible without

developing and disseminating improved agricultural technologies that can increase productivity to smallholder agriculture (Asfaw *et al.,* 2012).

The finding is also supported by past studies on relationship between farm sizes, factor of production and output which found out those larger farms are more likely to use advance farming inputs such as fertilizers, irrigation and improved seed varieties when compared to small farms, (Feder, Just & Ziberman, 1985) as cited in Betz (2009).

The findings reveal yield differences of 35.5 % (242 kgs/ acre); profitability of 27.9% and income of 21.2 %. Improved farming technologies such as high yielding crop varieties, chemical fertilizers, and irrigation techniques have been central in raising yields in other parts of the world; however, African farmers have been much slower in adopting these new methods. Reasons farmers cite is lack of information on how to apply the improved inputs, (Morris *et al.,* 2007).

Consequently, if improved inputs are not applied correctly, yield will be low and farmer will abandon the new technology, (Betz, 2009). The above scenario is expected amongst small holder farmers who are not being supported by any public or private agricultural extension service providers.

Agricultural technology development among smallholder farmers is very uneven and the effectiveness and relevance of agricultural services are key explanatory factors (Friis-Hansen, 2003). The result from above clearly shows that participation in agribusiness extension more often than not increases farm productivity. This signifies that there is a positively significant influence between access to agribusiness technologies and performance of smallholder rice farmers in Amolatar District therefore providing support for this study hypothesis.

This is supported by evidence from key informant interviews that reveal increase in productivity to be due to soil fertility, acquired knowledge on soil maintenance, increase

acreages cultivated and to some extent use of improved rice seeds. However, there is a significant usage of improved seeds amongst the non NAADS beneficiaries compared to NAADS beneficiaries which is quite encouraging. This is due to difference in efficient utilisation of inputs between NAADS and non NAADS members.

Conversely, vast literature exist showing an inverse relationship between land productivity and farm size (Sen., 1962; Berry & Cline,1979) suggesting that small farms are more productive and would be better target for available resources. Similar studies in Zimbabwe using stochastic frontier model revealed significant impact of the programme on smallholder farmers due to effective use of productive factors and land, (Obi & Chisango. 2011). This study revealed that NAADS beneficiaries waste and mismanaged production technologies compared to non-NAADS groups.

Recent analysis show that for a majority of staple crops, agricultural productivity is declining and any output gain is attributed to expansion of cultivated land (Kraybill, Bashsaasha, & Betz, 2009). These practices have contributed to Uganda having one of the highest rates of soil depletion in all of sub-Saharan Africa as argued by Pender *et al.,* (2004).

5.3.3 Access to FID support and performance of smallholder rice farmers.

The study findings revealed yield differences of 41.3% (295 kg/acre) from beneficiaries of technologies. This can be related to the soil and weather variability. There is a statistically significant difference between the conditions not likely due to chance and are probably due to the independent variable manipulation of the dependent variable. That is technologies influence the performance of the smallholder farmers. Friis *et al.,* (2004) agrees with these findings and further argued that farming is predominant occupation but farm income is still low, therefore access to new technologies and markets are still key element in reducing rural poverty.

Many studies agree that genuine participation of smallholder farmers in extension programme and technologies demonstration, practice, trials and management leads to enhance service delivery, efficiency, adoption of appropriate farming practices and sustainability in Zimbabwe (Mukasa,2002); Kenya (DANIDA, 2010), Uganda (Anderson, 2004); World Bank, 2010; Okoboi *et al.*, 2013).

The findings under this objectives is line with previous studies that found out that membership in farmers' organization has positive significance for the probability of participation in the extension program as expected and consistent with past findings (Benin *et al.*, 2011; Abebaw & Haile, 2013).

However, how people interact count significantly in functioning and development of society, in this case a farmers organisation. (Grant, 1985: Standifid & Marshal, 2000: World Bank, 2003: Tai, 2006: Styhie, 2008) as cited in Kugonza (2009).

Membership in farmers' organizations can influence participation positively due to either extension workers who might find it cheaper to target farmers group which helps them maximize the payoffs from efforts to build farmers capacity to demand advisory service (Benin *et al.,* 2011) or membership in a social group provides opportunities to discuss and observe practices of other members at no cost or time intensity (Gebreegziabher *et al.*, 2011).

However, in Uganda this is limitedly done yet the sector is the heart of the economy (NDP, 2010). On the contrary, however, speedy implementation of key aspects of NAADS programme in Soroti District was largely owed to favourable local government and farmer institutions environments created prior to NAADS, (Friis-Hansen *et al.,* 2004).

The finding was in agreement with reforms in extension in Uganda which includes privatization of funding, private delivery of extension and decentralization of authority to

lower level of governments, including delegation to NGOs, farmer organization and other grassroots control, (Bashaasha *et al.*, 2011).

At the same time the mean profitability of the NAADS supported rice smallholder farmers is 32.4% higher at 476,784 UGX compared to 343,663 UGX. According to the Analysis of Variance, there were significant differences between the groups in the mean profitability supporting the assertion that agribusiness technologies influence the performance of smallholder farmers. This finding is similar to that of a study in Uganda on smallholder farmers in Soroti District which revealed that greater involvement of farmers in development of agricultural technologies are key components in current reforms of agricultural advisory services (Friis *et al,* 2004). This requires capabilities to analyse causes and effects of their problems and to be active in adapting technologies to their local specific conditions of production which is not widely available among our farmers.

There is a statistically significant difference; therefore farmer institutional development positively influences smallholder rice farmers' performances. Institutions help in movement of produce and market linkages which covers all services involved in moving produce and products from farm to consumers (Semana, 2004).

The mean revenue amongst members who have benefitted from farmers institutional development is higher at 953,289 UGX than the non-beneficiaries at 693.480 UGX. Both the minimum and maximum revenue for the beneficiaries are significantly higher than that of the non-beneficiaries by 27.3%.

There is statistically significant difference between the conditions. NAADS supported farmer's registered higher profitability than non-members. The margin is small but significant enough to justify that farmer institutional development had an impact.

Public sector extension, in both developed and developing countries, is undergoing major reforms. This finding is in agreement with reforms in extension in Uganda which includes privatization of funding, private delivery of extension and decentralization of authority to lower level of governments, including delegation to NGOs, farmer organization and other grassroots control (Bashaasha *et al.*, 2011). These transferred powers, functions, and responsibilities for planning and implementation of agribusiness extension services from MAAIF to local governments face challenges of capacity, corruptions, staffing gaps, coordination and linkages with central government (Friis-Hansen & Kisauzi, 2004).

5.4 Conclusions

The conclusion of this study was based on study objectives as presented below

5.4.1 The extent to which agribusiness advisory services influence performance of smallholder rice farmers.

Based on the results, the null hypothesis was rejected and research hypothesis upheld leading to the inference that access to NAADS advisory services significantly contributes to performance of NAADS farmers in terms of productivity, profitability and income. Farmers who access agribusiness advisory service in terms of training in agronomic practices and post harvest handling realize higher yields, profits and fetch higher incomes than those who never access the advisory services.

5.4.2 The extent to which access to agribusiness technologies influence performance of smallholder rice farmers.

Based on the results, the null hypothesis was rejected and research hypothesis upheld leading to the inference that access to NAADS agribusiness technologies significantly contributes to performance of NAADS farmers in terms of productivity and incomes. Farmers, who access

agribusiness technologies specifically improved rice seed, realize higher yields and fetch higher incomes than those who never access the technologies.

5.4.3 The extent to which access to Farmer Institutional Development support influences performance of smallholder rice farmers.

Based on the results, the null hypothesis was rejected and research hypothesis upheld leading to the inference that access to Farmer Institutional development support under NAADS significantly contributes to performance of NAADS farmers in terms of productivity and incomes. Farmers who join farmer group's access extension support services which put them in a better position to better their farming practices leading to increased farm productivity and incomes.

5.5 Recommendations

The findings clearly support vast literature on the important role that agribusiness extension play in raising farmer's productivity and incomes. The findings have an implication on efforts by the private and public sector towards support to enhancing farmers' access to incomes and improving their livelihood. Basing on the study findings, implications and conclusions, the following recommendations emerge and are presented objectives by objectives below.

5.5.1 Access to agribusiness advisory services and performance of smallholder rice farmers.
- Concrete efforts need to be geared at reforming the agribusiness extension system that stands a test of time so as to enable the underserved and unreached farmers to access extension services. In particular, policy makers need to re-orient their efforts to strengthen the use of other channels so as to reach as many farmers as possible in the demand driven extension system. E-agribusiness extension should be promoted as in other countries for greater efficiency and effectiveness.

5.5.2 Access to agribusiness technologies and performance of smallholder rice farmers .

- Support services in the agricultural sector are needed especially in research, extension; marketing and credit form the pillars of sustainable agriculture and development. Specifically, agricultural research, comprising the generation of knowledge and information and the development, testing and adaptation of new technologies, is critical in achieving increased agricultural production and to strengthen input delivery mechanism and quality control, promotion of value addition technologies and mechanisation.

5.5.3 Access to Farmer Institutional Development supports and Performance of small holder rice farmers.

- Revival of producers and marketing cooperatives to facilitate marketing of farmers produce and policy strategic direction for development of farmer institutions and empowerment to demand and monitor implementation of development programmes.

5.6 Limitation of the study

The study was conducted within the environment of mixed factors which were beyond the control of the researcher, hence generating some limitations for the study.

- The data was collected from specific category of farmers across the District which made it cumbersome and expensive to reach all the target respondents. Besides, it was not easy to get NAADS staff and chairperson farmer's fora due to hurried NAADS reform process paralysing extension service delivery in the country.

- Lack of information dissemination strategy on reform brought politics, fear of soldiers and work place dynamics that made some key informants to decline interviews.

All the above challenges were technically, logistically and ethically addressed by the researcher.

5.7 Contributions to the study

Agribusiness research is still a virgin area for research since previous studies concentrated to the lower end of rice value chains. Though there is literature on agribusiness extension support, in Uganda particularly in Local Governments, no account had been made to explain the relationships between agribusiness extension support and performance of smallholder rice farmers. Besides, achieving the primary objectives, this study has contributed to the body of knowledge in the field of agribusiness and management in Uganda with specific reference to rice agribusiness in Amolatar District Local Government. The evidences established will serve as reference material for future research in agribusiness extension, advisory services delivery and management.

5.8 Areas for Future Research

The findings of the study together with conclusions drawn on each of the study objectives, limitations and recommendations, there are opportunities for further research that would provide more insights into the factors influencing agribusiness extension support and performance of smallholder farmer in terms of incomes, productivity, and profitability and other related poverty and livelihoods indicators. These areas include;

1. A compressive study to cover all the enterprises supported under NAADS since this study specifically looks at rice as an enterprise for comparisons.

2. A comprehensive study to establish why NAADS Extension programme was dissolved and replaced by Operation Wealth Creation (OWC).

3. A study to assess the capacity and performance of agribusiness extension under Operation Wealth Creation (OWC) UPDF implementation in the Districts of Uganda.

4. A study to establish the performance of extension programmes under single spine Agricultural extension systems in Uganda.

REFERENCES

Agricultural extension in Uganda., (2013).http//www.agriculturenetwork.org.

Ahmed,A.,(1982). *The role of the information system in development.* Studies Series, No.314.Baghdad, Iraq: Ministry of Culture and Information

Ajiru, C. O., & Chisango, F. F., (2011). *Performance of small holder agriculture under limited mechanisation and fast track Land reform programme in Zimbabwe.* IFAMR, Vol.14, Issue 4, 2011.

Alam.M.S, John. V. T & Kaung. Z., (1985). Insect Pests and Diseases of rice in Africa paper

Amin. E. M., (2005). *Social Science Research concepts, Methodology and Analysis*, Makerere University, Kampala, Uganda.

Amolatar District Development Plan., (DDP) (2013).

Amolatar District Local Government-Production & Marketing Report., (July 2014).

Amolatar District NAADS Review and Monitoring Report., (2014).

Amolatar District Production Review & Monitoring Report., (2014)

Anderson. J. R., & Feder, G., (2003). *Rural extension services*: World Bank Policy Research Working Paper, 2976, World Bank, Washington D.C.

Anderson. J. R., & Feder, G., (2007). *Hand book of agricultural economics, agricultural extension.* (pp. 2343-2372). In Evenson, R. & Pingali,P. (Eds.). *Agriculture and Rural Development Department,* World Bank, Washington, DC.

Anderson.J. R., (2007). *Agricultural Advisory Services.* Background Paper for the World Development Report 2008. The World Bank, Washington: DC.

Aryetee , E, and Appiah , E., (1995): *Association of Informal Producers in Ghana:* A report of a study of six informal association in agro-metal and food processing subsectors: FIT working document No: 13, FIT programme, ILO/ TOR , Geneva/Amsterdam

Asfaw S., Shiferaw, B., Simtowe, F., & Lipper, L., (2012). *Impact of modern agricultural technologies on small holder welfare*: Evidence from Tanzania and Ethiopia. Food policy, 37, 283-295. http://dx.doi.org/10.1016/j.foodpol.2012.02.013

ATTAS.,(2010). *Project implementation Manual-MAAIF-NAADS*. Kampala, Uganda

Badiane, O., (2010), *Agricultural and Structural Transformation in Africa.* IFPRI Baffoe (2000). Structural Adjustment and Agriculture in Uganda. Working Paper 149, ILO, Geneva.

Barbour R., (2008). Introducing qualitative research: *A student guide to the craft of doing qualitative research*. New Delhi: SAGE.

Baruah. B. K., (2013). *Agribusiness Management, its meaning, nature and scope, type of management tasks and responsibilities*. Department of Agricultural Economics and Farm Management,Assam Agricultural University Jorhat-785013.

Bashaasha, B., Mangheni, M.N. & Nkonya, E., (2011). *Decentralisation and Rural Services Delivery in Uganda.* IFPRI Discussion papar 01063.Febuary 2011.Retrived December 5, 2011.Kampala.

Benin S, Nkonya, E., Okecho, G., Randriamamonjy, J., Kato, E., Lubade, G., & Kyotalimye, G., (2011). *Returns to Spending on Agricultural Extension*: *The Case of National Agricultural Advisory Services (NAADS) Program of Uganda.* Agricultural Economics 42: 249–267.

Benin S., (2007). *Assessing the Impact of the National Agricultural Advisory Services (NAADS) in the Uganda Rural Livelihoods*. Washington, DC: International Food Policy Research Institute (IFPRI).

Benin S. E., Nkonya G., Okecho, J., Pender, S. Nahdy, S.M & Kayobyo, G., (2012). *Impact of and returns to public investment in Agricultural extension. The case of NAADS programme in Uganda:* IFFRI Research Report Washington, D.C, IFPRI.

Bergevoet. R. H. M. & Van Woerkum, C., (2006). *Improving the Entrepreneurial Competencies of Dutch Dairy Farmers through the use of Study Groups*. Journal. of Agric. Education and Extension Vol: 12 (1): 25-39).

Beshir H., Emana.B., Kassa, B., & Haji, J., (2012). *Determinants of chemical fertilizer technology adoption in North Eastern Highlands of Ethiopia: The double hurdle approach.* Journal of Research in Economics and International Finance, 2, 39-49.

Betz, M., (2009).*The effectiveness of Agricultural extension with respect to farm size: The case of Uganda.* AAEA & ACCI Joint Annual Meeting, Milwaukee, Wisconsin, July 26-29,2009.

Birner R., (2006). From best practice to best fit: *A framework for analysing agricultural advisory services*. Washington, DC: IFPRI.

Black.A. W., (2000) Extension theory and practice: *A review*. Australian*Journal of Experimental Agriculture*; 40 (4): 493-02.

Blair.R., Larissa, C., Lorenzo, M., & Seth, M. , (2012). *Impact Evaluation Findings after One Year of the Productive and Business Services Activity of the Productive Development Project,* El alvador. Mathematical Policy Research and Millennium Challenge Corporation (MCC).

Bne Saad.M.H.A.Al-., (1990). *An analysis of the needs and problems of Iraqi farm women: Implications for Agricultural Extension Services*. Unpublished doctoral thesis, University College, Dublin.

Bourne, L., (2011).Advising upwards. *Managing the perception and expectation of senior managenet stakeholders.*Managenet Decision 49(6),1001-10203.

Bray,P.,(1984). *Joseph Needham's science and civilisation in China: Vol.6.Biology and Biological technology.* Pt. II: Agriculture. Cambridge University Press.

Burt, R.S., (1973). *The different impact of social integration on participation in diffusion of innovators.* Social Science Research 2 (2) 125.

Cardesco, F., & Gartner, E. M., (1986). Research Report Writing. New York: Barnes and Noble.

Chambers, R., (1993). Challenging the professions: *Frontiers for rural development*. London:

Christoplos, I., Chipeta, S., & Peta, S., (2011). *Extension Evaluation Guide, Global Forum for Rural Advisory Services.*

Comte Auguste., (1875) *System of Positive Policy.* Vol.1, 2, 3 & 4(New York: Burt Franklin originally published (1851-1854)

Cooper, D. R., & Schindler, P. F., (2003). Business research methods. New Delhi: Tata McGraw Hill.

Coutts, J. A., (1994). Process, paper policy and practice: *A case study of the introduction of a formal extension policy in Queensland, Australia* 1987-1994. PhD thesis, Wageningen University.

CTA and Agro Forestry Centre., (2013).Value chains and Trade, Guidelines for value chain development. *A Comparative Review*. CTA,Lima,Peru.

Davis, J., & Goldberg. R., (1959). *A Concept of Agribusiness.* Boston: Alpine Press.

Denb, C. M., (1996). *The Good research agenda for small scale social research projects*; Open University press, Backingham-philadelphia, US

Dercon, S., & Christiaensen, L., (2007). Consumption risk, technology adoption and poverty traps: Evidence from Ethiopia. World Bank Policy Research Working Paper 4527, Washington, DC: World Bank.

Development Network of Indigenous Voluntary Associations (DENIVA)., (2005). Uganda:

Diane, S., (2004). Transfer agents and Global Networks in Trans nationalisation of policy. *Journal of European Public Policy*, 11(3):545-66.

Duaz, J.M.,(2005).*Empowering Rural Producer Organisations within the World Bank initiatives*: A Capitalisation Study. Uganda Country Case Study.

Endeva, D., (2012).Growing Business with small holders: *Guide to inclusive Agribusiness*. Published. GIZ.

Eveland, J.D.,(1986). Diffusion, Technology Transfer and Implementation: *Knowledge, Diffusion, utilisation* .8(2):303-22.

FAO - Food and Agriculture Organization of the United Nations., (2011) : FAOSTAT [electronic resource] Available at http://faostat.fao.org/site/342/default.aspx (Accessed October - November 2011).

FAO and MAAIF., (2012).Report on collation and dissemination of rice data and database on the status of rice industry in Uganda.Kampala.

Feder, G., Murgai, R., & Quizon, J. B., (2004). The acquisition and diffusion of knowledge: The case of pest management training in farmer field schools, Indonesia. Journal of Agricultural Economics, 55(2), 221-243.

Feleke, S., & Zegeye, T. ,(2006). Adoption of improved maize varieties in southern Ethiopia: factors and strategy options. Food Policy, 31(5), 442-457.

Friis-Hansen, E.,(2003). Knowledge Management. Regional Thematic Review: Agricultural Technology Development and Transfer in Eastern and Southern Africa. Report No. 1347. Rome: IFAD

Friis-Hansen, E., Aben, C., & Kidoid, M., (2004). Small holder Agricultural Technology Development in Soroti district: *Synergy between NAADS and Farmer Field Schools*. Copenhagen, Denmark and Makerere University,Kampala.P-251-256.

Friis-Hansen,E. & Kisauzi,D., (2004). Uganda: *Evolution of the extension-farmer relationships. In extension reforms for rural development*, vol.2, eds.Rivera.W.M & Alex.G. *Privatisation of Extension Systems: Case studies of international initiatives.* Agricultural and Rural Development Discussion Paper 9.Kampala, Uganda.

Gebregziabher, G., & Holden, S.,(2011). Does irrigation enhance and food deficits discourage fertilizer adoption in a risky environment: Evidence from Tigray, Ethiopia. J. Dev. Agric. Econ., 30(10), 514-528.

Gebremedhin, B., Jalata, M., & Hoekstra, D., (2009). Smallholders, institutional services, and commercial transformation in Ethiopia. Journal of Agricultural Economics, 40, 773-787. http://dx.doi.org/10.1111/j.1574-0862.2009.00414

Golafshani, N., (2003). *Understanding Reliability and Validity in Qualitative Research*. Qualitative report. Vol.8,No 4, December 2003.597-607.pp1-9.

Goldenkoff, R. , (2004). *Using focus groups*. In J. S. Wholey, H. P. Hatry & K. E. Newcomer (Eds). *Handbook of practical program evaluation*. San Fancisco, CA: Jossey-Bass.

Gordon, S., (2005). A *Report of the cooperative venture for capacity building*.PIRDC publication No.05/086, PIRDC Project No. GSA-1A.

GoU ., (2000). Plan for modernization of agriculture (PMA) Entebbe MAAIF.

Hailu, M., (2014). Spore. *The magazine for Agriculture and Rural development in ACP Countries*. http://spore.cta.int.No.169 April-May, 2014.Digital revolution.p-3.

Hair, J. F., Black, W. C., Babin, B.J., & Anderson, R. E., (2010). Multivariate data analysis: *A global perspective*. New York: Pearson.

Harling, K.F,. (1995). *Differing Perspectives on Agribusiness Management*. Agribusiness 11(6):501-511.

Hazel, P. C., Poulton,S., W. &Dorward, A., (2007). *The Future of small farms for poverty Reduction and Growth*,Discussion paper 2020,paper 42.

http://dx.doi.org/10.1016/j.foodpol.2005.12.003

IDEA Uganda., (2004) Uganda Idea: *Building Foundations for Agribusiness*. Final Report 2004.

IFPRI., (2014). *Agricultural Extension and Advisory Services Worldwide*. Kampala.

International Fund for Agricultural Development-IFAD Report., (2011). Enabling Poor Rural People to Overcome Poverty. Rome: IFAD Uganda Report.

IT Publications.

Jamandre, W. E., (2007). *Brief of the Agribusiness Perspective*

Jones, G. E., (1979). The Original Agricultural Advisory Service: *Lord Clarendon's practical instructors in mid-nineteenth century Ireland*. In Proceedings of the 4th international seminar on extension education. Dublin: University College, Department of Agricultural Extension.

Jones, G. E., (1981). *The origins of Agricultural Advisory Services in the nineteenth cent*ury. Social Biology and Human Affairs, 46 (2), 89-106.

Jones, G. E., (1982). Progress in rural extension and community development: *Extension and relative advantage in rural development*, The Clarendon letter. In G. E. Jones and M. J. Rolls (Eds.), Vol. 1. (p. 11-19). Chichester: John Wiley & Sons.

Jones, G. E.,(1994). Agricultural advisory work in England and Wales: *The beginnings. Agricultural Progress,* 69, 55-69., *Journal d'Agriculture Pratique* (1874). 38th year, vol. 2.

Jones, G.E., & Garforth, C., (2013). *The History, Development and Future of Agricultural Extension,* University of Reading,UK.

Journal of mixed methods research., (2003) Vol. 7 No. 4 October Sage Publications Production: Ayan Duar

Kaizzi,C.K.& C.S. Wortmann., (1998). *Nutrient balances and expected effects of alternative practice in farming systems in Uganda.* Agric., Ecosyst.Environ.71:115.

Kenmore, P., (2003). Sustainable Rice Production, Food security and Enhanced livelihoods, in Rice science: *Innovations and Impact for Livelihoods*, pp.27-34.edited by Mew.

Kerlinger, F. N., (1986). Foundations of Behavioral Research. New York: Halt, Rimehart and Winstorn.

Khan, K. & Shah,A., (2011). *Understanding performance measurement through the Literature.* Institute of Management sciences, Peshawar and Pakistan.

King, R. P., Boehlje, M., Cook, M. L. & Sonka, S. T., (2010). Agribusiness Economic and Management. *American Journal of Agricultural Economics* 92(2):554-570.

Kjaer, A.M & Joughin.J., (2013). *Politics or Design?The History of Agricultural Extension Services in Uganda* .A paper presented to Food Policy on the political Economy of Extension Services in Africa. AAAEC, September,22-25,2013.

Kolb, D. A., (1984). Experimental Learning: *Experience as the source of learning and development.* Engelwood Cliffs Prentice Hall, New Jersey; 1984.

Kothari C.R., (2003). *Research methodology methods and techniques.* 2nd Edition, wishwa Prakashan, New Delthi, India

Kraybill, D., B. Bashaasha., & M. Betz.,(2009). *Productivity and marketed surplus in Uganda Agriculture, 1997-2007.* Working Paper. Dept of Agric. Econ., Ohio State University.

Krejcie, R. V., & Morgan, D. W.,(1970). *Determining sample size for research activities.* Educational and Psychological Measurement, 30, 607-610.

Kugonza, S. P.K., (2009). *Influence of formal and informal institutions on outsourcing public construction projects in Uganda.* Unpublished PhD thesis. International Development Department, School of Government and Society, University of Birmingham.

Kumar, R.,(2005). *Research Methodology:* Astep-by-step for Beginners,2[nd]Ed. SAGE Publication,London.

Lavrakas, P. J., (2008). *Encyclopaedia of survey research methods*. California: SAGE.

Lucas, C. P., (1913). A Historical geography of the British colonies: Vol. Ill, West Africa (3rd ed.). Oxford: Clarendon Press.

MAAIF., (2012). National Rice Development Strategy (NRDS, 2008-2018).

MAAIF., (2012). Uganda National Rice Development strategy (UNRDS) 2008-2018, Kampala, Uganda. www.agriculture.go.ug.

MAAIF., (2013).Inside Uganda Agriculture advisory services and Research. Special Project

MAAIF Report., (2014).Uganda Government suspension of NAADS programme in September, 2007 on grounds of implementation failures

Madukwe, M., (2006), *Delivery of agricultural extension services to farmers in developing countries: Issues for consideration.* http://www.knowledge.cta.int/en/content/view/full/3009 (Accessed on 2 June 2008).

Martey, E., Alexander, N., Wiredu, B. O., Asante, K. A., Dogbe, W., Caleb, A., & Ramatu, M. Hassan (2013). *Factors influencing participation in rice development projects: A case of Small Holder Rice farmers in Northern Ghana. International Journal of development and economic sustainability*. Vol 1, No.2, pp-13-27. June, 2013

Mese,T., (2013). *The necessary distinction between methodology and philosophical assumptions in healthcare research.* Scandinavian Journal for Caring Sciences, 27, 750- 756

Ministry of Agriculture Animal Industry and Fisheries (MAAIF) Report .,(2000). Kampala, Uganda.

Ministry of Agriculture, Animal Industry and Fisheries-MAAIF., (2010). Agriculture for Food and Income Security: *Agriculture Sector Development Strategy and Investment Plan: 2010/11- 2014-15*. Republic of Uganda.

Morris,M., V.A Kelly,R.J. Kopicki & D. Byerlee.,(2007). *Fertilizer use in African Agriculture: Lessons Learned and Good practice Guidelines.* Washington,D.C: World Bank.

Mugenda O.M. & Mugenda, A. G., (1999). *Research methods, quantitative and qualitative approaches*. ACTS press, Nairobi Kenya.

Mwanje, E.E., & Duvel G.H.,(1998).*Coping with changes in Agricultural extension in Uganda and Implications for Program Evaluation:* Areview of recent experiences.South African Journal of Agricultural Extension,South Africa.Tydskr Landbouwoorl,vol.27

NAADS Guidelines., (2005).

NAADS Guidelines., (2010).

Nateekateeka, C., (2013). *The effect of NAADS interventions on households incomes*: Case study of Kashongi Sub county, Kiruhura District. (Unpublished Disertation) , UMI-Kampala.

National Agricultural Advisory Services Act, (2001).

NDP-Republic of Uganda., (2010). The National Development Plan 2010/11 − 2014/15. Kampala: Government of Uganda.

Neely, A., Adam, C., & Kennerly , M., (2002). Performance prism: *The score card of measuring and managing business success*. Granfield School of Management.

Nega, F., Mathijs, E., Deckers, J., Haile, M., Nyssen, J., & Tollens, E., (2010). Rural poverty dynamics and impact of intervention programs up on chronic and transitory poverty in Northern Ethiopia. African Development Review, 22, 92-114. http://dx.doi.org/10.1111/j.1467-8268.2009.00229

Newcomer, K. E., & Triplett, T., (2004). Using surveys. In J. S. Wholey, H. P. Hatry & K. E. Newcomer (Eds). Handbook of practical program evaluation. San Francisco, CA: Jossey-Bass.

Ng, D. & Siebert, J. W., (2009). *Toward Better Defining the Field of Agribusiness Management*.International Food and Agribusiness Management Review 12, 4, 123-142.

Norman, J.C & Kebe., B.(2004). *African small holder farmers: rice production and sustainable livelihoods.* Department of Crop Science, University of Ghan. Legon, Accra, Ghana.

Nwuzor,B.A., (2000). Nature and Role of Agricultural Extension in Economics Development, ECOWAS Company ENUGU, Nigeria.

Nygaard, D., Paarlberg, R., Sanyu-Mpagi, J., Matovu, R & Babu, S.,(1997). *The modernisation of Agriculture: The political challenge of moving from Adjustment to Investments.* IFPRI, Kampala

Okoboi, G., Kuteesa, A., & Barungi, M., (2013). *The Impact of the NAADS Programme on Households' Production and Welfare in Uganda.* African Growth Initiatives at Brookings, Working paper No.7, March, 2013.

Omamo, S. W.Diao, X., Wood, S., Chamberlin, J., You, L., Benin, S., Wood-Sichra, U., & Tatwangire, A.,(2006). *Strategic Priorities for Agricultural Development in Eastern and Central Africa.* Washington, DC: International Food Policy Research Institute.

Owens, T., Hoddinott, J., & Kinsey, B., (2001). *The Impact of Agricultural Extension on Farm Production in Resettlement Areas of Zimbabwe, The Centre for the Study of African Economies.* Working Paper Series, paper 144.

Pant, P.R., (2009). *Social science research and thesis writing*. Kathmandu: Buddha Academic Enterprises Pvt. Ltd. presented at the rice workshop, Lusaka Zambia. Report. Pg 104,211,218 & 233.MAAIF.NARO & NAADS.

Pender, J., E. Nkonya, P.Jagger, D.Sserukuma & H. Ssali., (2004). *Strategies to increase Agricultural productivity and Reduce Land Degradation: Evidence from Uganda.* Agricultural Economics.31:181-195.

Rivera, M.W., William, Z. & Gay, A., (2000).Contracting for extension: *Review of emerging practices*. AKIS Good practice. Agricultural knowledge information system. Therapic group. The World Bank.

Rivera, W. M., & Gustafson, D. J., (1991). Agricultural extension: *Worldwide institutional evolution and forces for change*. Amsterdam and New York: Elsevier.

Rogers, E. M.., (1962).*Diffusion of Innovation*. Glencoe: Free press.:ISBN0-612-6284-4.

Rogers., (1983). *Personal influence, the part played by people in the flow of mass communications.* Transaction publishers.pp-19.

Röling, N., & De Jong, J., (1998). Learning: *Shifting paradigms in education and extension studies. Journal of Agriculture. Education and Extension* 1998; 5 (3): 143-61.

Rottger, A., (2004).Strengthening Farm-Agribusiness linkages in Africa: *Summary results of five country studies in Ghana, Nigeria, Kenya, Uganda and South Africa*. FAO-AGSF Occasional paper No.6.

Ruby, A.Ward, T. W. & Wysocki, A., (2011). Agribusiness extension: *Past, Present and Future*. International Food and Agribusiness Management Review.Vol.14; Issue 5.

Ryan, B. & Gross, N.,(1943). *The diffusion of hybrid seed corn in two Iowa communities*. Rural Sociology: 8(1).15-24.

Samuel G., Sharp K., (2007). Commercialization of Smallholder Agriculture in Selected Tef-Growing Areas of Ethiopia, *Ethiopian Journal of Economics*, Volume XVI, No1, April 2007.

Saranktakos,S., (2005). *Social Reaesrch*. Third edition, Palgrave, Macmillian Publication.

Semana A.R., (1998).*The need for establishing a research extension linkage*. In CIAT African Workshop series No.2.Work shop proceeding Bean research in East Africa Mukono,Uganda,27-25 June 1988.

Semana, A.R., (2004). *Agricultural Extension Services at Crossroads: Present dilemma and possible solutions for future in Uganda.* Department of Agricultural extension/ Education, Makerere University,Kampala.

Sokolovsky, M.,(1996). Case study as a research method to study life histories of elderly people: *Some ideas and a case study of a case study. Journal of Ageing Studies*, 10(4), 281-294.

Sonka, S. & Hudson, M. A., (1989). Why Agribusiness Anyway? Agribusiness 5(4): 305-314.

Staatz, J., & Dembele, N.,(2007). Agriculture for development in sub-saharan Africa. Background paper for the World Development Report 2008.

Teddlie, C., & Tashakkori, A., (2009). Foundations of mixed methods research: *Integrating quantitative and qualitative approaches in the social and behavioral sciences*. California: SAGE.

Trochim, W. M. K., (2006). *Research methods knowledge base.* Retrieved January 12, 2013, from http://www.socialresearchmethods.net/kb/index.php

UBOS., (2010). Statistical abstracts-(2009). Kampala: UBOS

UBOS .,(Uganda Bureau of Statistics). (2003).

Uganda Amolatar Production Committee Report., (2014)

Uganda National Farmers Federation (UNFFE)., (2014).*Exploring New Alliances in Agricultural Extension: Worldwide Extension Study*-ARENET.

UNCST. Uganda National Council for Science and Technology. (2002). *Status of ICT in Uganda: Scan-ICT Preliminary Baseline study*. Uganda country report UNCST.

UNDP., (2008), *Human Development Report*. New York OUP.University Press.

UNDP.,(2002). *Handbook of monitoring and evaluation for results*. Newyork: UN Development Programme office of evaluation and strategic planning.

Victor, M., (2002). *Participation of Small holder Farmers in Agricultural extension service in Zambia*. University of Dabulin.Unpublished Msc Thesis.

White, K. D., (1970). *Roman farming.* London: Thames and Hudson.

White, K. D., (1977). *Country life in classical times.* London: Eiek Books.

World Bank .,(2002). *A source book for poverty reduction strategies.* Vol 1: core techniques and cross cutting issues; Washington, DC, World Bank.

World Bank .,(2009). Sharing the Growth in Uganda: *Do higher food prices help or hurt the poor in Uganda?*

World Bank.,(2010). *Country Assistance Strategy for the Republic Of Uganda. International Development Association, International Finance Corporation and Multilateral Investment Guarantee Agency.* Report no. 54187-ug; World Bank. Available at: http://siteresources.worldbank.org/UGANDAEXTN/Resources/Uganda_CAS.pDf (accessed October 2010)

World Bank Report., (2008). Evaluation of lessons from World Bank group experience: *Growth and productivity in Agriculture and Agribusiness.* Conference edition, IEG/World Bank/IFC/MIGA.

World Bank., (2008). *Uganda agriculture sector performance. A Review for the Country economic memorandum.* Kampala. World Bank Uganda Office.

World Bank., (2010). *Agriculture and rural development series: Gender and governance in rural Service: Insight from India, Ghana, and Ethiopia.* World Bank, Washington, D.C.

World Bank. ,(2012). *ATAAS project appraisal document*, AFRICA, AFTOR, Kampala

World Development Report., (WDR). (2008). *Agriculture for development.* The World Bank, Washington, DC

Xu Kuangdi & Shen Guofang., (2003). *Promoting Chinese rice production through innovative science and technology*, pp 11-18 of proceeding of the International Rice Conference,16-19 september,2002,Beijing,China,ed.by   Mew.T.V.*et   al*.

APPENDICES

Appendix I: Researcher administered House hold Questionnaire

Purpose: This questionnaire is prepared with the aim of collecting data pertaining to agribusiness extension supports and performance of small holder rice farmers in Amolatar District. This questionnaire data will serve as a major input for the master thesis research being conducted in pursuit of purely academic purpose.

I would like to firmly assure the all the respondents on the confidentiality of the responses. Thank you in advance for your cooperation!!!

Sub-County_____

Parish_____

Village _____

A-   DEMOGRAPHIC CHARACTERISTICS:

Household Member	Sex(0= male, 1= female)	Age(years) <20 20-30 31-40 41-50 >51	Education	Marital Status 1= Married 2= Single 3= Divorced 4= Widowed)

B-   SOCIO-ECONOMIC CHARACTERISTICS:

B 1: Farm Characteristics   Do you have your own land?

Yes	No

Size...........................

1-   How did you acquire the land you have cultivated for the last one year

    ( ) Rent   ( ) Crop sharing agreement   ( ) From Relatives ( ) from friends ( ) other; Specify_____

2-   How large was the land holding size you have acquired via the method mentioned above_____

B 2: Farm Production Characteristics:

3-   What are the primary and secondary activities

Tick	Primary Activity	Tick	Secondary Activity
	Crop Production		Crop Production
	Livestock rearing		Livestock rearing
	Mixed farming		Mixed farming
	Off-Farm employment		Off-Farm employment
	Non-farm Activities		Non-farm Activities
	Domestic Activities		Domestic Activities
	Other		Other

4-   If the activity you are primarily engaged in is crop cultivation or mixed farming, then which crops have you cultivated for the specified crop production year?

Type of Crop Produced	Primary Reason for Production	Land Devoted in Acres	Crop Harvested/ bags	Crops Sold/bags	Selling Price/Unit

Primary reason for production
          1= Own consumption

2= Selling to the market

3= Partial for consumption and partially for market

4= Other

How often do you cultivate land in a given year?

1=Once in a year

2= Twice in a year

3= More than twice in a year

B3: Farm production input and Technology Use:

5- What type and Number of Production, value addition, Storage and Transport assets are in your Household

No	Production, value addition, Storage and Transport assets	Qty
	Production	
	Post harvest handling	
	Storage	
	Transport Equipment	

6- Which of the following farm inputs have you applied as of the production year?

No	Description		1-Yes 2-No	Quantity in Kgs	Cost	Accessibility	Sources of Financing
1	Fertiliser	DAP					
		Urea					
		Others					
2	Improved Seeds						

Cost:
1= Very High
2= High
3= Medium
4= Low
5= Very Low

Accessibility
1= Accessible
2= Not Accessible

Sources of Financing
1= Own Savings
2= Credit
3= Safety net
4= Remittance
5= Other

7- If you are not applying any one of the above mentioned inputs, what are the possible reasons?_____

B 4: Asset Endowments:

8- How many of the following items do you own?

Livestock	Cows	
	Oxen	
	Calves	
	Goats	
	Sheep	
	Beehives	
	Others(Specify	

B 5: Social Capital:

9- Are you a member of any local organization or association?

1= Yes   2= No

10- If yes which type?

1= Farmers Cooperative

2= Savings and Credits Institution

3= Women's Association

4= Other (Specify).

11- If you are a member of a local organization or association, how does it benefit you?

	Membership Benefit	1= Yes, 2= No
Farm Inputs	Input Delivery	
	Affordable input price	
Marketing	Fair Farm Gate out price	
	Strong Bargaining Power	
	Reliable Storage Facility	
Access to Credit	Easy Access to Credit	
	Low Cost Credit	
	Increased Savings Habits	

B 5: Access to Public Goods/Services

12- Are you a member of the agricultural extension package of your area?

1= Yes   2= No

13- If "yes", which of the following services have you received so far?

	Type of Goods/Services Received	Yes	No
1	Technical Advice		
2	Market Information(Input/output)		
3	Credit		
4	Farm Equipment		
5	Improved Seeds		
6	Fertilizer		
7	Capacity Building Training		
8	Weather Related/Meteorological		

B 6: Infrastructure and Market Information

14- Who is the major buyer of your farm outputs?

1= rural consumers

2= cooperatives

3= middlemen from towns

4= urban consumers

5= others (please specify): _____.

15- Do you have road access to the nearest town/city?

1= Yes, 2= No

16- How do you get to the nearest output markets most often?

1= on foot 2= bicycle 3= by car   4=Other (Specify)

17- How do you acquire market information pertaining output prices most often?

	Means of Accessing Information	1= Yes 2= No	Dependence on as source of information(High, Medium, Low)	Reliability of the Source(High, Medium, Low)	Frequency of Use by rank(1st, 2nd, 3rd 4th e.t.c)
1	Radio				
2	Government/Extension Agents				
3	Television				
4	Mobile Phone				
5	Traders/Middlemen				
6	Neighbours				
7	Others(Specify)				

### C-	Household Income and Welfare Outcomes

C 1: Welfare Outcomes

18- Non-food Expenditure/Consumption of Households in the last 12 months

	Type of non-food consumed/purchased	Total Expenditures
1	Sugar	
2	Salt	
3	Kerosene	
4	Cooking Oil	
5	Clothes and Shoes	
6	Education	
7	Health and Medical Care	
8	Housing	
9	Farm Implements	
10	Durables (radio, bed, mattress, mobile,etc ………) (total in the last production year)	
	Total	

19- How many times does your household consume basic food on average in a day?

1= one time in a day

2= two times in a day

3= three times in a day

4= more than three times in a day

C 2: Household Income

20- Estimation of household incomes from rice sales and cost of production for the last twelve months

Classification	Description	Item	Quantity(yield)	Total Value Earned	Total cost of production
Farm	Rice sale				
Non-farm activities/off-employment?	Self Employment				
	Off-Farm Employment				
Others	Specify				
Total					

D: Access to agricultural Advisory Services

27.Statements on Agribusiness Advisory Services	Yes (2)	No (1)
Do you have access to agribusiness/advisory services?		
Have you or any other member attended training organised by NAADS/Government extension Worker?		
Are the members of the household who attended training equally represented by Gender?		
Have you or any other members of the household ever attended NAADS training for more than two times in the last three months?		
Was the training you attended about rice crop management?		
Was the training that you attended at farmer groups or technology demonstration sites?		
Are you satisfied with advisory services provided by NAADS as an Institution		

F: Access to Farmer Institutional Development:

28 Statements on Farmer Institutional Development	Yes (2)	No (1)
Do you or any other member of this household belong to a farmers group?		
Do you feel you opinion is considered in group decisions making?		
Were the majority in your group equally represented by Gender?		
Are all the members of your farmer organisation belonging to NAADs		
Is it easy for you to express your view in group decision making?		
Please give reasons for no answers		

Appendix II: Interview guide

Interview Guide for Key informants (DPMO, DAO, DCDO, DCO, NAADS Coordinators, extension workers, Agricultural Advisory Services Providers (AASPs), chairperson farmers forum, Leaders of agribusiness entities, sub county chiefs, farmer fora and CSOs staff) implementing agribusiness extension programme in Amolatar district Local Government.

Background information

Household Member	Sex(0= male, 1= female)	Age	Education	Marital Status 1= Married 2= Single 3= Divorced 4= Widowed)

1. Describe rice agribusiness extension project in your district or organization

2. Is your extension support covering areas listed below and describe briefly;

   ✓ Promotion of improve agribusiness technologies and practices

   ✓ Advisory services provision to farmers

   ✓ Framer institutional development support to farmers

3 Have the above interventions achieved its objectives…………………., if not why?

4 Has rice agribusiness extension support services increased household incomes, if yes by how much……………………..if no give reasons……………………………..

5 Are your rice farmers accessing financial services?

   ✓ From which organizations

   ✓ What constraints do they face in accessing financial services

   ✓ Suggest way that can improve financial service to farmers

6 As an institution, what problems are you facing in implementing rice agribusiness extension project?

7 Suggest possible solutions

8 How are you rice farmers accessing value addition facilities,

9 How is it utilization ,

10 challenges and possible solutions

11 What policy challenges are you rice farmers facing

12 What is the future of rice agribusiness extension in your district or organization

Thank you for your time.

Appendix III: Focus Group Discussion Guide

1. What kind of rice agribusiness services do you received in you group

2. How do you decide on the rice agronomy to practice

3. How do you benefit from rice agribusiness projects

4. What are you contribution to rice agribusiness extension services

5. How can effective extension services be sustained

6. Are you involve in monitoring extension programme service delivery

7. What is the level of satisfaction with extension services delivery

8. Comment on agribusiness services provided in your area/group/organization

9. Comment on the management of extension services in your district/organization

10. How can access to agribusiness extension support be improved in you district/organization

Appendix IV: Documentary Checklist

S/N	Source	Location
1.	Text books	Libraries and resource centres
2.	Policy papers	NAADS,MAAIF and district offices
3.	Statistics	UBOS,NAADS,MAAIF offices and websites
4.	Working documents	Amolatar district Local Government and LLG offices
5.	Journal/research works	Libraries and resource centres
6.	Project proposal	Districts, CSOs and NAADS
7.	Annual reviews/reports	District and CSO offices
8.	Minute books and files	production office, farmer for a ,farmer groups ,SAACOs
9.	Financial statements	Banks and SAACOS
10.	TPC minutes	CAO Office, District planner and NGO offices

Appendix V: Krejcie & Morgan Population Table (1970)

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Appendix VI: Map of Uganda showing Amolatar District

Key — Amolatar District

Source: UBOS 2014

Appendix VII: Map of Amolatar District showing Sampled Sub-Counties

KEY

- ETAM
- NAMASALE
- AMOLATAR TC
- AGIKDAK
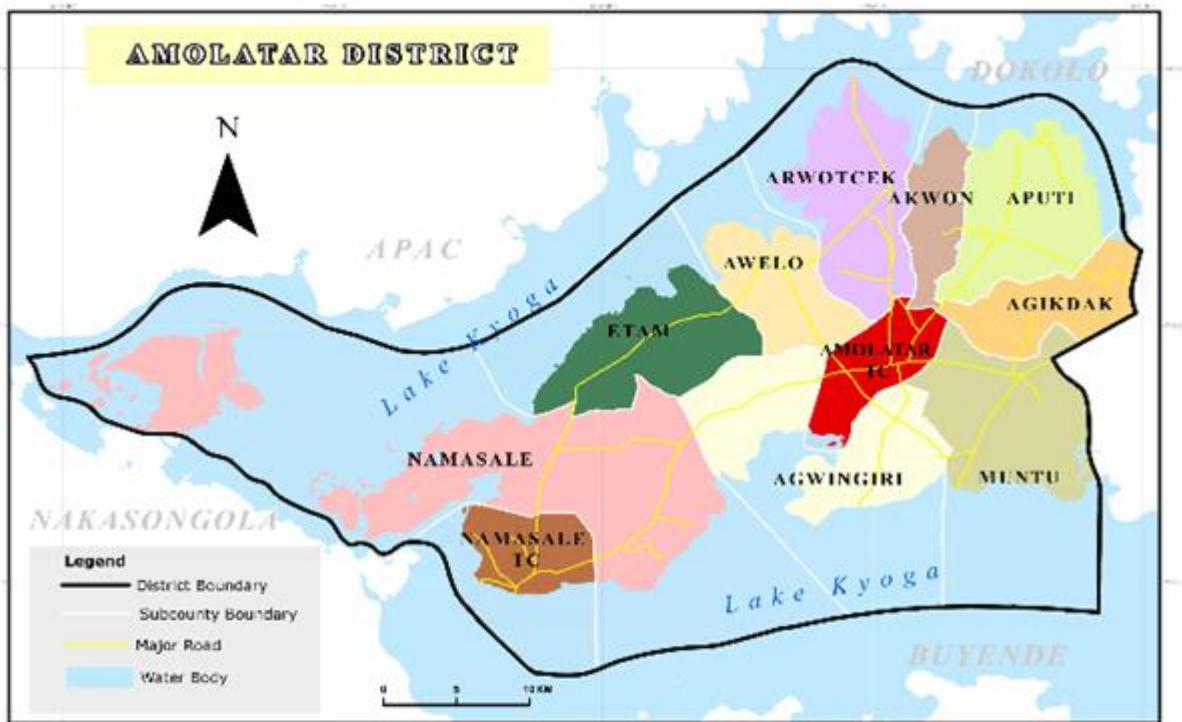
Source, UBOS, 2014

Appendix VIII: Rice production trend in Amolatar district
Rice production trend in Amolatar district

Year	Acreage	Yield (Tons)
2014	112	2,500
2013	920	2,830
2012	830	2,490
2011	230	690
2010	100	90
Total	**2,192**	**8,600**

Source: Secondary data from DAO Office-Amolatar District

Appendix ix: RESULT ANALYSIS OUTPUTS.
DESCRTIVES FOR INFERRENTIAL STATISTICS

use_improved_riceseed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	29	29.0	34.9	34.9
	Yes	54	54.0	65.1	100.0
	Total	83	83.0	100.0	
Missing	System	17	17.0		
Total		100	100.0		

credit_access

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	61	61.0	61.6	61.6
	yes	38	38.0	38.4	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

member_local_farmer_orgn

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	25	25.0	25.8	25.8
	yes	72	72.0	74.2	100.0
	Total	97	97.0	100.0	
Missing	System	3	3.0		
Total		100	100.0		

member_public_ext_package

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	17	17.0	18.5	18.5
	yes	75	75.0	81.5	100.0
	Total	92	92.0	100.0	
Missing	System	8	8.0		
Total		100	100.0		

mkt_categories

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	open market (locally mainly to middlemen)	91	91.0	91.9	91.9
	2	8	8.0	8.1	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

access_agric_advisory

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	44	44.0	44.0	44.0
	yes	56	56.0	56.0	100.0
	Total	100	100.0	100.0	

access_naads_advisory

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	OTHER SOURCES	24	24.0	24.2	24.2
	NAADS ONLY	27	27.0	27.3	51.5
	NAADS AND OTHER SOURCES	48	48.0	48.5	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

attend_naads_training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	frequently attend training	16	16.0	16.2	16.2
	rarely attend training	83	83.0	83.8	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

farmergrp_member

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	40	40.0	40.0	40.0
	yes	60	60.0	60.0	100.0
	Total	100	100.0	100.0	

member_naads

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	56	56.0	60.9	60.9
	YES	36	36.0	39.1	100.0
	Total	92	92.0	100.0	
Missing	System	8	8.0		
Total		100	100.0		

Descriptive Statistics

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
age	100	20	74	43.88	1.077	10.766
acreage_rice	94	1.0	15.0	2.277	.1736	1.6826
yield_per_acre	94	100	2000	609.91	36.231	351.273
percentage_sold	100	0	100	84.06	2.305	23.053
sellingprice1_s2	94	900	1400000	16442.55	14877.024	144238.096
revenue	94	190000	2018750	842732.54	36799.779	356787.093
Valid N (listwise)	93					

COMPARISONS

farmergrp_member * use_improved_riceseed Crosstabulation

			use_improved_riceseed		Total
			No	Yes	
farmergrp_member	no	Count	15	16	31
		% within farmergrp_member	48.4%	51.6%	100.0%
		% within use_improved_riceseed	51.7%	29.6%	37.3%
		% of Total	18.1%	19.3%	37.3%

ii

			No	Yes	Total
	yes	Count	14	38	52
		% within farmergrp_member	26.9%	73.1%	100.0%
		% within use_improved_riceseed	48.3%	70.4%	62.7%
		% of Total	16.9%	45.8%	62.7%
Total		Count	29	54	83
		% within farmergrp_member	34.9%	65.1%	100.0%
		% within use_improved_riceseed	100.0%	100.0%	100.0%
		% of Total	34.9%	65.1%	100.0%

member_naads * use_improved_riceseed Crosstabulation

			use_improved_riceseed		Total
			No	Yes	
member_naads	NO	Count	14	30	44
		% within member_naads	31.8%	68.2%	100.0%
		% within use_improved_riceseed	53.8%	58.8%	57.1%
		% of Total	18.2%	39.0%	57.1%
	YES	Count	12	21	33
		% within member_naads	36.4%	63.6%	100.0%
		% within use_improved_riceseed	46.2%	41.2%	42.9%
		% of Total	15.6%	27.3%	42.9%
Total		Count	26	51	77
		% within member_naads	33.8%	66.2%	100.0%
		% within use_improved_riceseed	100.0%	100.0%	100.0%
		% of Total	33.8%	66.2%	100.0%

farmergrp_member * access_agric_advisory Crosstabulation

			access_agric_advisory		Total
			no	yes	
farmergrp_member	no	Count	27$_a$	13$_b$	40
		% within farmergrp_member	67.5%	32.5%	100.0%
		% within access_agric_advisory	61.4%	23.2%	40.0%
		% of Total	27.0%	13.0%	40.0%
	yes	Count	17$_a$	43$_b$	60
		% within farmergrp_member	28.3%	71.7%	100.0%
		% within access_agric_advisory	38.6%	76.8%	60.0%
		% of Total	17.0%	43.0%	60.0%
Total		Count	44	56	100
		% within farmergrp_member	44.0%	56.0%	100.0%
		% within access_agric_advisory	100.0%	100.0%	100.0%
		% of Total	44.0%	56.0%	100.0%

Each subscript letter denotes a subset of access_agric_advisory categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.942[a]	1	.000		
Continuity Correction[b]	13.395	1	.000		
Likelihood Ratio	15.211	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.792	1	.000		
N of Valid Cases	100				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.60.
b. Computed only for a 2x2 table

member_naads * access_agric_advisory Crosstabulation

			access_agric_advisory no	access_agric_advisory yes	Total
member_naads	NO	Count	36[a]	20[b]	56
		% within member_naads	64.3%	35.7%	100.0%
		% within access_agric_advisory	85.7%	40.0%	60.9%
		% of Total	39.1%	21.7%	60.9%
	YES	Count	6[a]	30[b]	36
		% within member_naads	16.7%	83.3%	100.0%
		% within access_agric_advisory	14.3%	60.0%	39.1%
		% of Total	6.5%	32.6%	39.1%
Total		Count	42	50	92
		% within member_naads	45.7%	54.3%	100.0%
		% within access_agric_advisory	100.0%	100.0%	100.0%
		% of Total	45.7%	54.3%	100.0%

Each subscript letter denotes a subset of access_agric_advisory categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	20.027[a]	1	.000		
Continuity Correction[b]	18.154	1	.000		
Likelihood Ratio	21.405	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	19.810	1	.000		
N of Valid Cases	92				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.43.
b. Computed only for a 2x2 table

farmergrp_member * use_improved_riceseed Crosstabulation

			use_improved_riceseed No	use_improved_riceseed Yes	Total
farmergrp_member	no	Count	15[a]	16[b]	31
		% within farmergrp_member	48.4%	51.6%	100.0%
		% within use_improved_riceseed	51.7%	29.6%	37.3%
		% of Total	18.1%	19.3%	37.3%
	yes	Count	14[a]	38[b]	52
		% within farmergrp_member	26.9%	73.1%	100.0%

			48.3%	70.4%	62.7%
	% within use_improved_riceseed				
	% of Total		16.9%	45.8%	62.7%
Total	Count		29	54	83
	% within farmergrp_member		34.9%	65.1%	100.0%
	% within use_improved_riceseed		100.0%	100.0%	100.0%
	% of Total		34.9%	65.1%	100.0%

Each subscript letter denotes a subset of use_improved_riceseed categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.936[a]	1	.047		
Continuity Correction[b]	3.049	1	.081		
Likelihood Ratio	3.892	1	.049		
Fisher's Exact Test				.059	.041
Linear-by-Linear Association	3.889	1	.049		
N of Valid Cases	83				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.83.
b. Computed only for a 2x2 table

farmergrp_member * credit_access Crosstabulation

			credit_access		Total
			no	yes	
farmergrp_member	no	Count	27[a]	12[a]	39
		% within farmergrp_member	69.2%	30.8%	100.0%
		% within credit_access	44.3%	31.6%	39.4%
		% of Total	27.3%	12.1%	39.4%
	yes	Count	34[a]	26[a]	60
		% within farmergrp_member	56.7%	43.3%	100.0%
		% within credit_access	55.7%	68.4%	60.6%
		% of Total	34.3%	26.3%	60.6%
Total		Count	61	38	99
		% within farmergrp_member	61.6%	38.4%	100.0%
		% within credit_access	100.0%	100.0%	100.0%
		% of Total	61.6%	38.4%	100.0%

Each subscript letter denotes a subset of credit_access categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.578[a]	1	.209		
Continuity Correction[b]	1.091	1	.296		
Likelihood Ratio	1.598	1	.206		
Fisher's Exact Test				.290	.148
Linear-by-Linear Association	1.562	1	.211		
N of Valid Cases	99				

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.578[a]	1	.209		
Continuity Correction[b]	1.091	1	.296		
Likelihood Ratio	1.598	1	.206		
Fisher's Exact Test				.290	.148
Linear-by-Linear Association	1.562	1	.211		
N of Valid Cases	99				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.97.
b. Computed only for a 2x2 table

member_naads * credit_access Crosstabulation

			credit_access		Total
			no	yes	
member_naads	NO	Count	36[a]	20[a]	56
		% within member_naads	64.3%	35.7%	100.0%
		% within credit_access	64.3%	57.1%	61.5%
		% of Total	39.6%	22.0%	61.5%
	YES	Count	20[a]	15[a]	35
		% within member_naads	57.1%	42.9%	100.0%
		% within credit_access	35.7%	42.9%	38.5%
		% of Total	22.0%	16.5%	38.5%
Total		Count	56	35	91
		% within member_naads	61.5%	38.5%	100.0%
		% within credit_access	100.0%	100.0%	100.0%
		% of Total	61.5%	38.5%	100.0%

Each subscript letter denotes a subset of credit_access categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.464[a]	1	.496		
Continuity Correction[b]	.212	1	.646		
Likelihood Ratio	.462	1	.497		
Fisher's Exact Test				.515	.322
Linear-by-Linear Association	.459	1	.498		
N of Valid Cases	91				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.46.
b. Computed only for a 2x2 table

farmergrp_member * attend_naads_training Crosstabulation

			attend_naads_training		Total
			frequently attend training	rarely attend training	
farmergrp_member	no	Count	10[a]	30[b]	40
		% within farmergrp_member	25.0%	75.0%	100.0%
		% within attend_naads_training	62.5%	36.1%	40.4%

			10.1%	30.3%	40.4%
	yes	Count	6_a	53_b	59
		% within farmergrp_member	10.2%	89.8%	100.0%
		% within attend_naads_training	37.5%	63.9%	59.6%
		% of Total	6.1%	53.5%	59.6%
Total		Count	16	83	99
		% within farmergrp_member	16.2%	83.8%	100.0%
		% within attend_naads_training	100.0%	100.0%	100.0%
		% of Total	16.2%	83.8%	100.0%

Each subscript letter denotes a subset of attend_naads_training categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.870[a]	1	.049		
Continuity Correction[b]	2.852	1	.091		
Likelihood Ratio	3.799	1	.051		
Fisher's Exact Test				.057	.047
Linear-by-Linear Association	3.830	1	.050		
N of Valid Cases	99				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.46.
b. Computed only for a 2x2 table

member_naads * attend_naads_training Crosstabulation

			attend_naads_training		Total
			frequently attend training	rarely attend training	
member_naads	NO	Count	11_a	44_a	55
		% within member_naads	20.0%	80.0%	100.0%
		% within attend_naads_training	84.6%	56.4%	60.4%
		% of Total	12.1%	48.4%	60.4%
	YES	Count	2_a	34_a	36
		% within member_naads	5.6%	94.4%	100.0%
		% within attend_naads_training	15.4%	43.6%	39.6%
		% of Total	2.2%	37.4%	39.6%
Total		Count	13	78	91
		% within member_naads	14.3%	85.7%	100.0%
		% within attend_naads_training	100.0%	100.0%	100.0%
		% of Total	14.3%	85.7%	100.0%

Each subscript letter denotes a subset of attend_naads_training categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.707[a]	1	.054		
Continuity Correction[b]	2.622	1	.105		
Likelihood Ratio	4.149	1	.042		
Fisher's Exact Test				.069	.048
Linear-by-Linear Association	3.667	1	.056		
N of Valid Cases	91				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.14.

b. Computed only for a 2x2 table

FOR OBJECTIVES

ADVISORY SERVICES VS YIELD AND REVENUE

YIELD

Descriptives

yield_per_acre

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
no	43	495.50	301.999	46.054	402.56	588.45	100	2000
yes	51	706.37	363.527	50.904	604.13	808.62	300	2000
Total	94	609.91	351.273	36.231	537.96	681.86	100	2000

ANOVA

yield_per_acre

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1037372.924	1	1037372.924	9.143	.003
Within Groups	10438118.005	92	113457.804		
Total	11475490.929	93			

Descriptives

yield_per_acre

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
OTHER SOURCES	23	627.83	480.473	100.186	420.05	835.60	100	2000
NAADS ONLY	25	551.00	232.890	46.578	454.87	647.13	300	1417
NAADS AND OTHER SOURCES	45	638.15	334.423	49.853	537.68	738.62	175	1850
Total	93	612.17	352.490	36.552	539.57	684.76	100	2000

ANOVA

yield_per_acre

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	129550.711	2	64775.355	.516	.599
Within Groups	11301403.651	90	125571.152		
Total	11430954.361	92			

REVENUE

Descriptives

revenue

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
no	43	710739.92	332201.627	50660.273	608503.35	812976.49	190000	1900000
yes	51	954020.42	341256.743	47785.502	858040.42	1050000.43	570000	2018750
Total	94	842732.54	356787.093	36799.779	769655.47	915809.60	190000	2018750

ANOVA

revenue

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.381E12	1	1.381E12	12.147	.001
Within Groups	1.046E13	92	1.137E11		
Total	1.184E13	93			

Descriptives

revenue

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
OTHER SOURCES	23	830919.57	451826.959	94212.434	635534.94	1026304.19	190000	1900000
NAADS ONLY	25	836538.33	416026.716	83205.343	664810.95	1008265.72	427500	2018750
NAADS AND OTHER SOURCES	45	858272.22	265607.390	39594.412	778474.93	938069.52	332500	1757500
Total	93	845665.14	357580.044	37079.323	772022.41	919307.88	190000	2018750

ANOVA

revenue

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.424E10	2	7.118E9	.055	.947
Within Groups	1.175E13	90	1.305E11		
Total	1.176E13	92			

TECHNOLOGY DEVELOPMENT VS YIELD AND REVENUE

YIELD

Descriptives

yield_per_acre

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No	28	440.77	95.132	17.978	403.89	477.66	200	625
Yes	49	682.11	346.130	49.447	582.69	781.53	100	1850
Total	77	594.35	304.199	34.667	525.31	663.40	100	1850

ANOVA

yield_per_acre

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1037777.212	1	1037777.212	12.983	.001
Within Groups	5995045.876	75	79933.945		
Total	7032823.089	76			

REVENUE

Descriptives

revenue

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No	28	718437.50	228189.134	43123.693	629954.99	806920.01	342000	1187500
Yes	49	911150.17	373342.687	53334.670	803913.63	1018386.71	190000	2018750
Total	77	841072.84	339467.479	38685.910	764023.17	918122.50	190000	2018750

ANOVA

revenue

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.617E11	1	6.617E11	6.130	.016
Within Groups	8.096E12	75	1.080E11		
Total	8.758E12	76			

FARMER INSTITUTIONAL DVT VS YIELD AND REVENUE

YIELD

Descriptives

yield_per_acre

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
no	40	471.67	284.699	45.015	380.62	562.72	100	2000
yes	54	712.31	362.998	49.398	613.24	811.39	200	2000
Total	94	609.91	351.273	36.231	537.96	681.86	100	2000

ANOVA

yield_per_acre

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1330733.058	1	1330733.058	12.068	.001
Within Groups	10144757.871	92	110269.107		
Total	11475490.929	93			

Descriptives

yield_per_acre

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NO	55	574.70	357.640	48.224	478.01	671.38	100	2000
YES	31	663.12	367.684	66.038	528.25	797.99	200	1850
Total	86	606.57	361.658	38.999	529.03	684.11	100	2000

ANOVA

yield_per_acre

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	155002.899	1	155002.899	1.188	.279
Within Groups	10962676.850	84	130508.058		
Total	11117679.749	85			

REVENUE

Descriptives

revenue

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
no	40	693480.21	308657.468	48803.031	594766.76	792193.66	190000	1900000
yes	54	953289.81	352137.097	47919.789	857174.89	1049404.74	380000	2018750
Total	94	842732.54	356787.093	36799.779	769655.47	915809.60	190000	2018750

Descriptives

revenue

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NO	55	787190.15	363971.796	49077.947	688794.79	885585.51	190000	1900000
YES	31	936577.42	360355.858	64721.823	804397.82	1068757.02	380000	2018750
Total	86	841039.05	367692.396	39649.291	762205.64	919872.46	190000	2018750

ANOVA

revenue

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.424E11	1	4.424E11	3.364	.070
Within Groups	1.105E13	84	1.315E11		
Total	1.149E13	85			

PROFIT

Access to advisory services

Descriptives

profit

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
no	44	344586.73	345358.031	52064.682	239588.29	449585.17	-350000	1550000
yes	56	518840.04	425702.929	56886.947	404836.05	632844.02	-350000	1668750
Total	100	442168.58	400052.290	40005.229	362789.53	521547.63	-350000	1668750

ANOVA

profit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.482E11	1	7.482E11	4.857	.030
Within Groups	1.510E13	98	1.540E11		
Total	1.584E13	99			

Access to naads advisory services

Descriptives

profit

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
OTHER SOURCES	24	446297.92	473328.030	96617.679	246429.02	646166.81	-350000	1550000

	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
NAADS ONLY	27	424572.52	457829.193	88109.269	243461.32	605683.72	-350000	1668750
NAADS AND OTHER SOURCES	48	454630.21	331850.268	47898.460	358270.94	550989.48	-350000	1407500
Total	99	444412.71	401455.060	40347.752	364343.91	524481.51	-350000	1668750

ANOVA

profit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.572E10	2	7.862E9	.048	.953
Within Groups	1.578E13	96	1.644E11		
Total	1.579E13	98			

Technology Development

Use of improved seed

Descriptives

profit

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
No	29	343663.79	260785.329	48426.620	244466.36	442861.23	-350000	837500
Yes	54	476784.41	444188.734	60446.430	355544.22	598024.59	-350000	1668750
Total	83	430272.39	393478.800	43189.909	344353.90	516190.87	-350000	1668750

ANOVA

profit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.344E11	1	3.344E11	2.191	.143
Within Groups	1.236E13	81	1.526E11		
Total	1.270E13	82			

Farmer Institutional Development

Member Farmer group

Descriptives

profit

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
no	40	343480.20	308657.482	48803.033	244766.75	442193.65	-160000	1550000
yes	60	507960.83	441095.331	56945.162	394013.83	621907.84	-350000	1668750
Total	100	442168.58	400052.290	40005.229	362789.53	521547.63	-350000	1668750

ANOVA

profit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.493E11	1	6.493E11	4.188	.043
Within Groups	1.519E13	98	1.550E11		
Total	1.584E13	99			

Member NAADS group

Descriptives

profit

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NO	56	423133.18	375675.837	50201.795	322526.53	523739.82	-350000	1550000
YES	36	456497.22	468200.985	78033.497	298080.80	614913.64	-350000	1668750
Total	92	436188.67	412165.239	42971.197	350831.67	521545.68	-350000	1668750

ANOVA

profit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.439E10	1	2.439E10	.142	.707
Within Groups	1.543E13	90	1.715E11		
Total	1.546E13	91			

Appendix X: UMI Introductory Letter

UGANDA MANAGEMENT INSTITUTE

Telephones:	256-41-4259722 /4223748 /4346620	Plot 44-52, Jinja Road
	256-31-2265138 /39 /40	P.O. Box 20131
	256-75-2259722	Kampala, Uganda
Telefax:	256-41-4259581 /314	Website: http://www.umi.ac.ug
E-mail:	admin@umi.ac.ug	

Your Ref:

Our Ref: G/35

24 October 2014

TO WHOM IT MAY CONCERN

MASTERS IN MANAGEMENT STUDIES DEGREE RESEARCH

Mr. Francis Ojok is a student of the Masters Degree in Management Studies of Uganda Management Institute 31st Intake 2013/2014 specializing in Project Planning and Management, **Reg. Number 13/MMSPPM/31/077.**

The purpose of this letter is to formally request you to allow this participant to access any information in your custody/organisation, which is relevant to his research.

His Research Topic is: *"Agribusiness Extension Supports and Performance of Small Holder Rice Farmers in Amolatar District, Uganda"*

Stella Kyohairwe (PhD)
Ag. Head, Department of Political and Administrative Science