THE CONTRIBUTION OF CROP FARMING ON ECONOMIC WELFARE IN WANALE SUB REGION MBALE DISTRICT UGANDA.

BY

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A RESEARCH REPORT SUBMITTED TO THE COLLEGE OF ECONOMICS AND MANAGEMENT IN THE DEPARTMENT OF ECONOMICS AND APPLIED STATISTICS IN PARTIALFULFILLEMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELORS OF ARTS IN ECONOMICS DEGREE OF KAMPALA INTERNATIONAL UNIVERSITY

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SUPERVISOR'S APPROVAL

This Report has been written by WABOMBA KADILI registration number, 1163-05154-06508 under my close supervision and has satisfied the requirements and guidelines for Research Report, it is accordingly approved for submission to the department of Economics and Applied statistics of Kampala international university.

Signed.....Franklin.....

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Date.....21st. JUNE. 2019.....

DEDICATION

I dedicate this piece of work to my dear family mostly my beloved parents Mr. Malele Badiru and his beloved wife Amina Nabumboyi, brothers and sisters and to my dear friends for investing in my education and ensuring that I uninterruptedly pursue my career dreams for their support and encouragement during the entire period of study.

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LIST OF ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank.
DSIP	Agricultural Sector Development Strategy and Investment Plan
FAO	Food and Agricultural Organization of the United Nations
GDP	Gross Domestic Product
GNI	Gross National Income
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MDG	Millennium Development Goal
MFPED	Ministry of Finance Planning and Economic Development
NAADS	National Agricultural Advisory Services
NCD	Non-Communicable Diseases
NPHC	National Population and Housing Census
NTD	Neglected Tropical Diseases
OECD	Organization for Economic Co-operation and Development
PMA	Plan for Modernization of Agriculture
R&D	Research and Development
RD&E	Research, Development and Extension
SHT	Smallholder Hybrid Triangle
UBOS	Uganda Bureau of Statistics
UNHS	Uganda National Household Survey

ABSTRACT

Empirical studies across many developing countries document that improving crop farming is the main pathway out of poverty .It's for this reason that the main Objectives of the study was to find out the contribution of crop farming on economic welfare and other objectives were to identify major factors that affect crop farming and to establish the relationship between crop farming and economic welfare. This study considered crop farming as the independent variable and economic welfare as the dependent variable. The study used both primary and secondary data. Primary data was collected from a sample of 100 respondents Documentary review was used to collect secondary data. Data analysis was based on descriptive research design and regression methods. Data was analyzed using SPSS (Version 15.0). Findings from this study revealed that low crop farming Productivity has been the biggest challenge to agricultural crop farming in Wanale sub region. Crop farming was found to be constrained by lack of capital, pests and diseases, and limited farming skills. Land shortage, bad climate and weather, and limited use of productivity enhancing inputs also limited crop farming; other constraints include poor rural infrastructure, price fluctuation, landslides and post-harvest losses. This study also established that the Wanale sub region economic welfare has not been inclusive; the factors that constrained achievement of economic welfare include: corruption; lack of investment and devastation of infrastructure; low access to assets and entrepreneurship; poverty and low financial intermediation; underemployment and low salaries; and inefficient fiscal transfers. This study concluded that in order for Wanale sub region to achieve economic welfare, enhancing crop farming of the smallholder farmers should be mainstreamed into the national development policies. In order to raise agricultural crop farming productivity, the study recommended resource support for farmers, promotion of access to assets by the farmers, more investment in research, development and extension, rigorous use productivity enhancing inputs and rural infrastructural investment. To enable achievement of economic welfare in Wanale sub region, this study recommended that government should reduce income gap between urban and rural residents, improve health status of populace, promote more inclusive labor markets and improve indicators of economic development.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The study scrutinized the contribution of crop farming on economic welfare in Wanale Sub Region in Mbale district. Crop farming was considered as the independent variable while economic welfare was the dependent variable. This chapter covered the background to the study, the statement of the problem, general and specific objectives, the research questions, Hypotheses, scope of the study and the significance of the study

1.1.0 Background to the Study.

1.1.1 Historical Background of crop farming.

Crop farming has existed since the "dark ages". In the Andes of South America, the ancient Egyptians, as well as most indigenous cultures around the world, routinely used a stick to make a hole in the ground, put seeds in the soil by hand, and covered the seeds with the foot. Even today hundreds of thousands of farmers in Central and South America seed their crops using the same technology. About 10,000 years BC, people harvested their food from the natural biological diversity that surrounded them, and eventually domesticated their crops .Moreover; millions of hectares of land have been traditionally sown with a hand jab planter. (Ravallion and Datt, 1998; Loayza and Raddatz, 2010; Ravallion and Datt, 1999, Mellor, 2001; Thirtle et al., 2003)

Likewise, prehistoric crop farming in Europe, Asia, and Africa proceeded from simple gathering of grains from wild stands to intentional propagation, often with planting sticks. However, by 4000 BC, the first farmers in Africa (the Linearbandkeramik) were using ox-drawn ploughs to dramatically expand their cropping. The development of

crop farming spans thousands of years in Africa have been affected by human cultures, climate variations, and evolving technologies (Derpsch; 2004)

In Uganda, most small scale farmers practice mixed crop farming where they grow various types of crops on the same piece of land which may not lead to increased yields. In the 1950s until independence in 1962, British Colonial Office policy encouraged the development of co-operatives for subsistence farmers to partially convert to selling their crops: principally coffee, cotton, tobacco, and maize. David Gordon Hines (1915–2000) (as Commissioner of Co-operatives from 1959 to independence in 1962 and then as a civil servant until 1965) developed the movement by encouraging eventually some 500,000 farmers to join co-operatives.
Moreover, the farmers in Uganda's 2.5 million smallholdings and scattered large commercial farms provide the majority of their own and the rest of the country's staple food requirements (World Bank Development Indicators, 2014).

Uganda's key crop farming products can be divided into cash crops and food crops; the district's crop farming is characterized by smallholder farming with hand hoe as the major production tool. Farmers produce various commodities, mostly for own consumption. The primary economic activity in the district is agriculture inform of crop farming. Some of the main crops are coffee, beans, matooke, maize, onions, potatoes, carrots, and sweet potatoes. The smallholder farmers lack transport, inputs and technology to help them increase their production and reduce pests and disease. They also lack access to financial services, to give them capital for improving and expanding their productivity. Crop farming is mainly rain-fed as Mbale district is featured by Mount Elgon and rainfall in most parts of region is plentiful and allows for double cropping.
Although literatures indicate that crop farming is effective in reducing poverty and enhancing the overall economic welfare. (United Nations Development Programme, 2019)

The study assessed the contribution of crop farming on economic welfare in Wanale sub Region Mbale district, Uganda.

1.1.2 Theoretical Background of the study

The study was guided by the theory of Traditional Agriculture advanced by Theodore William Schultz an American agricultural Economist. In Transforming Traditional Agriculture Schultz challenged the prevailing view, held by development Economists that farmers in developing countries were irrational in their unwillingness to innovate. He argued that, to the contrary, the farmers were making rational responses to high taxes and artificially low crop prices set by their governments. Schultz also noted that governments in developing countries lacked the agricultural extension services critical for training farmers in new methods. He viewed agricultural development as a precondition for industrialization. The theory was adopted for this study because Schultz visited farms when he traveled to gain a better understanding of agricultural economics on crop farming. After World War II, he met an elderly and apparently poor farm couple who seemed quite content with their life. He asked them why. They answered that they were not poor; earnings from their farm had allowed them to send four children to college, and they believed that education would enhance their children's productivity and, consequently improved their welfare (Mats Lundahl, 1987) 'Efficient but Poor' Schultz theory of traditional agriculture)

1.1.3 Conceptual Background of the study

Crop farming according to crop science review 2016, refers to farming mainly for the purpose of producing agricultural crops. Crop farming can refer to a business or enterprise in which an agri-entrepreneur ventures in the commercial, substence production of crops. Many individuals own or lease large tracts of farmlands, while others engage in corporate farming for the large-scale production of selected crops for profit. Some examples are coffee, Irish potato, cassava, corn, cotton, soybean, tomato

and other vegetables, and many more. In this study, crop farming will be characterized by high crop productivity.(Crop science Review 2016)

Broadly, economic welfare is the level of prosperity and standard of living of either an individual or a group of persons. In the field of economics, it specifically refers to utility gained through the achievement of material goods and services. In other words, it refers to that part of social welfare that can be fulfilled through economic activity. (Investopedia 2018).

Tejvan Pettinger (2017) defined economic welfare as a level of prosperity and quality of living standards in an economy. Economic welfare can be measured through a variety of factors such as GDP and other indicators which reflects welfare of the population such as literacy, number of Doctors, Level of pollution etc. He further explained that economic welfare refers to how people are doing.

According to (Roefie Hueting, 2011) welfare is dependent on factors like employment, income distribution, labor conditions, leisure time, production and the scarce possible uses of the environmental functions. Economic welfare is measured in different ways, depending on the preferences of those measuring it. Factors used to measure the economic welfare of a population, include: GDP, literacy, access to health care, and assessments of environmental quality.

1.1.4. Contextual Background of the study

This research took place in Wanale sub region Mbale district as a case study. It aimed at filling the literature gap between the contributions of crop farming on economic welfare in Wanale sub region.

Although literature including World Bank (2008, pp.1-6) and Cervantes-Godoy & Dewbre (2010, p.19) indicate that crop farming growth is effective in reducing poverty, unemployment, inequalities, economic development and enhancing economic welfare. These effects have been so varied and unclear across many developing countries including Uganda. In view of the large share of Uganda's working poor being farmers

and that agriculture is the main productive base of the economy, targeting the sector in development may have major impacts on welfare, economic growth and inclusion.

1.2 Problem Statement

Uganda, like many developing countries in the world particularly those on the continent of Africa continue to increasingly find it extremely difficult for their escalating populations to be food secure yet part of the low food production is sold by the population. The only approach of increasing the incomes of these entirely rural subsistence farmers, who dominate the agricultural production systems in Uganda and with limited adoption to modern agricultural practices, is to increase crop production and its quality through provision and use of inputs such as pesticides, fertilizers, labour, machinery, high yielding seeds and above all extension services.

The agricultural sector has not been able to transform itself to the degree envisioned, and the rural populace has remained poor and disadvantaged than expected (IFAD, 2013). Individual welfare process therefore seems not to be broad based, decentralized and pro-poor as the problems of underemployment, poverty, and hunger continue to persist especially in the rural areas. The role that crop farming can play to anchor holistic economic welfare seems to be unresolved and attracting little attention.

It is upon the above problem that this study seeks to elicit the contribution of crop farming on economic welfare as a way to engender knowledge that can make individual's growth and welfare process more decentralized and sustainable in order to enable a faster overall national economic transition and an ultimate address of unemployment, poverty, and hunger problems. The study will attempt to ascertain the major factors that determine crop farming in Wanale sub region, it will ascertain if crop farming is a major determinant of economic welfare in the region, and it will find out the impact of crop farming on major indicators of economic welfare of Wanale sub region, Mbale district.

1.3.0 Study Objectives

1.3.1 The general objective of the study

The general objective of the study was to find out the contribution of crop farming on economic welfare in Wanale sub region Mbale district Uganda.

1.3.2 The specific objectives of the study

(i) To determine the major factors that affect crop farming in Wanale sub region.

(ii) To find out the major contribution of crop farming on economic welfare in Wanale sub region.

(iii) To establish the relationship between crop farming and economic welfare in Wanale sub region.

1.4 Research Questions

The research questions that guided this study were:

(i) What are the key factors that determine crop farming in Wanale sub region?

(ii) What is the major contribution of crop farming on economic welfare in Wanale sub region?

(iii) What is the relationship between crop farming and economic welfare in Wanale sub region?

1.5 Hypotheses of the study

Multiple regression analysis of the equation below was applied using primary data that was collected from the field.

$$EW = \alpha + \beta_1 CF_1 + \beta_2 MZ_2 + \beta_3 BN_3 + \beta_4 BE_4 + \beta_5 IP_5 + \varepsilon$$

Where:

EW= Economic welfare (Household income, Employment, Medical Care, Education, Housing facilities), α = Constant, CF_1 = Coffee Growing, MZ_2 = Maize Growing, BN_3 = Banana growing, BE_4 = Beans growing, IP_5 = Irish potato Growing, β_1..... β_5 are regression coefficients of the variables and ε = error term .This analysis was done using SPSS.

It is hypothesized that:

Null hypothesis (Ho): crop farming does not constitute a binding determinant of economic welfare. (Ho: $\beta = 0$)

Alternative hypothesis (H1): crop farming is a binding determinant of economic welfare

(H1: $\beta \neq 0$), the alternative hypothesis stated was non-directional; a two tail test was applied at 5% confidence level to test the significance of the hypothesis.

1.6.0 Scope of the Study

1.6.1 Geographical scope

The study took place in East Africa specifically Uganda in Wanale sub-region of Mbale District. The district is located in the Eastern region of Uganda bordering several districts, Manafwa and Bududa in the East, Sironko in the North, Bukedea on the Northwest, Budaka and Pallisa in the west, Tororo and Butaleja in the Southwest. It lies between the longitudes of 34°E, 35°E and latitude 00°45°N with land area of 534.4 square Km and population density of about 620 persons per square Km. The district has one Municipality with three divisions namely, Wanale, Industrial and Northern.

1.6.2 Content scope

The independent variable of the study was crop farming and the dependent variable was economic welfare. Crop farming included; coffee growing, Banana farming, Maize farming, Beans and Irish potato growing. Economic welfare was determined by Household income, Employment, Medical Care, Education and Housing facilities

1.6.3 Time scope

The study was fully completed within the period of Seven Months of the researcher's Degree study program running from December 2018 to June 2019.The researcher took three (3) months to draft a research proposal and later he conducted the final study which took four (4) months.

1.6.4 Theoretical scope

The study was guided by the theory of Traditional Agriculture advanced by Theodore William Schultz an American agricultural economist. In Transforming Traditional Agriculture Schultz challenged the prevailing view, held by development economists that farmers in developing countries were irrational in their unwillingness to innovate.

1.7 Significance of the Study

The outcome of this study hopes to provide findings that the government may base on while considering alternative Welfare policies that are more holistic for the country .The study will be a useful guide to the government of Uganda, police makers, policy analysts and the public on how crop farming can be used as a tool for economic welfare of Uganda.

This study will also guide baseline schools and higher institution of learning to elicit and clarify many issues about crop farming and Economic Welfare. It is an intention of this study to engender knowledge on how to raise the pace of welfare of Wanale Sub region while also enlarging its size by including people who were formerly bypassed by crop farming and Economic welfare, particularly those in crop Farming, as the process will foster sustainable Economic Welfare of Wanale Sub region.

This study shall also guide the people of Wanale sub region as it is the objective of this study to come up with a new model/framework that shall attempt to explain how augmentation of Crop farming in Wanale sub region can enable the achievement of sustainable food security, employment-led growth, poverty reduction, rural transformation and overall economic Welfare.

The study therefore hopes to create a cluster of knowledge that will serve as pedestal for other researchers.

1.8.0 LIMITATION AND DELIMITATIONS

1.8.1 Limitations of the study

Sample size. Although the study population was about 2,000 households, only 100 households (respondents) were reached in this study due to financial and time constraints.

Lack of reliable data on Uganda's agricultural productivity. Reliable time series data on Uganda's agricultural productivity was not readily available with UBOS, MAAIF or any other government department. The researcher relied on data compiled by FAO and World Bank.

1.8.2 Delimitations of the study

Population excluded in the study. The study did not include large scale farmers in the process of data collection. This was because the study focused specifically on the marginalized sections of a population. This study concentrated on the smallholder farmers who have missed the benefits of economic growth for decades.

The use of multiple regressions to analyze the determinants of crop farming. Estimation of farm productivity could not be accurately done for all the smallholders contacted. More than 90% of the farmers were found not keeping record of their farming activities. The estimation of crop farming was therefore based on recall. The delimitations were addressed in such a way that they did not strongly undermine the results of this study or the conclusions derived there from.

1.9 Definition of key terms used in the study

Crop farming according to crop science review 2016, refers to farming mainly for the purpose of producing agricultural crops. Crop farming can refer to a business or enterprise in which an agri-entrepreneur ventures in the commercial, substence production of crops.

Tejvan Pettinger (2017) defined economic welfare as a level of prosperity and quality of living standards in an economy. Economic welfare can be measured through a variety of factors such as GDP and other indicators which reflects welfare of the population such as literacy, number of Doctors, Level of pollution etc. He further explained that economic welfare refers to how people are doing.

Gross Domestic Product (GDP): This refers to the total money value of all goods and services produced within the geographical boundaries of a country usually one year. it is given by;

GDP =G+I+G.

Where, G= government expenditure, I=private investment, C= Private consumption.

Crop farming productivity: Fulginiti and Perrin (1998, pp.45-46) defined crop farming productivity as output produced by a given level of input(s) in the agricultural sector of a given economy. Similarly, Olayide and Heady (1982) defined crop farming productivity as the ratio of the value of total farm outputs to the value of total inputs used in farm production.

Poverty: The lack of basic needs and services such as food, clothing, beddings, shelter, basic health care, markets, education, information and communication (World Bank, 2013).

Unemployment: All the individuals who are without work/jobs; they may either be in the process of moving to new jobs or actively seeking work (ILO, 2013).

CHAPTER TWO

LITERATURE REVIEW

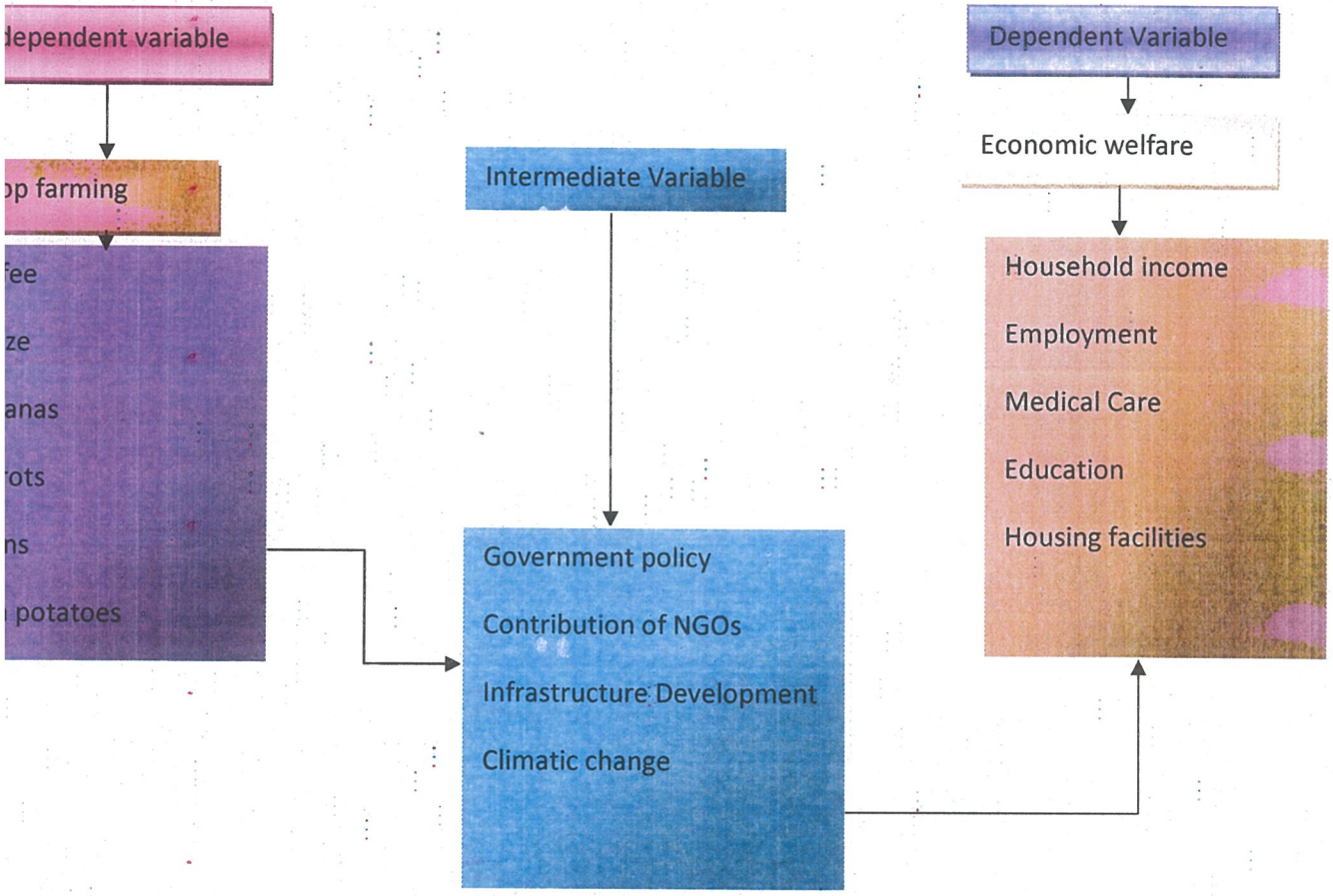
2.0 Introduction

This chapter provides survey of literature as background for informing the research questions, and methodology. Few relevant academic literatures on Crop farming and economic welfare is provided and discussed. The literature review is organized under main themes based on the research objectives. Theories and perspectives of economic welfare, Measures of Economic welfare, capabilities and Crop farming.

2.1 Conceptual Framework

The framework below presents the links between crop farming and the indicators of economic welfare. Improvements in the indictors depict partial achievement of economic welfare. The framework is the researcher's own position on the problem and it gives direction to the study. It guided the researcher in this study between crop farming and economic welfare in order to achieve the set objectives.

Figure 1: A Conceptual Framework showing the independent variable and dependent variable



Source: Developed by Kadir (2019)

2.2 Empirical Evidence of Economic Welfare

Traditionally economic welfare is meant as the general wellbeing of individuals within a setting. However, the experience of 1950s and 1960s when many developing countries achieved their growth targets but the living standards of majority remained unchanged signaled that something was wrong with this narrow definition of welfare. (Todaro and Smith, 2011). In the 1970s economic welfare got redefined in terms of reduction or elimination of poverty, income inequality and unemployment within the context of a growing economy.

According to Todaro and Smith (2011), economic welfare refers to a multidimensional process that involves major changes in social structures, social benefits, popular

attitudes, and national institutions as well as the acceleration of economic growth, the reduction of inequality and the eradication of poverty.

Amartya Sen, the 1998 Nobel laureate in economics, Sen occupies a unique position among modern economists. He is an outstanding economic theorist, a world authority on social choice and welfare economics. He argues economic welfare as the process of expanding the real freedoms that people enjoy. Welfare should therefore be conceptualized as the sustained elevation of an entire society and social system toward a better or more humane life. (Sen, 1998).

Todaro and Smith (2004) identified three basic components (core values) for understanding welfare, these are: sustenance, self esteem and freedom, they represent the common goals sought by all individuals and societies. Sustenance refers to the basic goods and services such as food, clothing and shelter that are necessary to sustain an average human being at the bare minimum level of living.

According to Todaro and Smith (2011), regardless of the components of better life, welfare in all societies must have the following three objectives:-

(i) To increase the availability and widen the distribution of basic life-sustaining goods such as food, shelter, health and protection.

(ii) To raise the levels of living including addition to higher incomes, the provision of more jobs, better education, and greater attention to cultural and human values.

(iii) To expand the range of economic and social choices available to individuals and nations by freeing them from servitude and dependence not only in relation to other people and nation states, but also to the forces of ignorance and human misery. These crosscutting objectives of welfare are realistic and are in line with the Sustainable Development Goals and Targets for vision 2040 for Uganda.

According to (Roefie Hueting, 2011) welfare is depends on factors like employment, income distribution, labour conditions, leisure time, and scarce possible use of the

environment functions. Economic welfare is measured in different ways, depending on the preference of those measuring it.

2.3 Empirical studies of crop farming

A valid generalization about the poor is that they are disproportionately located in the rural areas, are primarily engaged in crop farming, and more are women and children than adult males. About two thirds of the very poor depend on subsistence agriculture (crop farming) for livelihood, either as smallholder farmers or as low paid farm workers. (Todaro and Smith, 2011, Pg 236).

In Africa and Asia about 80% of all target poverty groups are located in rural areas, compared to about 50% in Latin America. (World Bank, 2010) According to Bravo-Ortega and Lederman (2005), an increase in overall GDP coming from crop farming labor productivity is on average times more effective in raising incomes of the poorest quintile in developing countries than an equivalent increase in GDP coming from non farming labor productivity. According to the World Bank (2008), crop farming contributes to development in many ways; as an economic activity, as a livelihood, and as a provider of environmental services, making it a unique instrument for welfare. (World Bank, 2008).

The Food and Agricultural Organization (FAO) of the United Nations (1990) indicated that there is mounting evidence that Rural Non Farm (RNF) income is an important resource for farm and other rural households, including the landless poor as well as rural town residents. However, the traditional image of farm households in developing countries has been that they focus almost exclusively on farming and undertake little rural non-farm (RNF) activity. This image persists and is widespread even today Policy debate still tends to equate farm income with rural incomes, and rural/urban relations with farm/non-farm relations. Industry Ministries have thus focused on urban industry and Ministries of Agriculture on farming, and there has been a tendency even among agriculturists and those interested in rural development to neglect the RNF sector. One of the main reasons why the promotion of RNF activity can be of great interest to

developing country policy-makers is in the face of credit constraints, where RNF activity affects the performance of agriculture by providing farmers with cash to invest in productivity-enhancing inputs. Furthermore, development of RNF activity in the food system (including agro-processing, distribution and the provision of farm inputs) may increase the profitability of farming by increasing the availability of inputs and improving access to market outlets. In turn, better performance of the food system increases rural incomes and lowers urban food prices (FAO, 1990).

2.4 Review of Related studies

Byamukama Godfrey Kereere (2007) conducted a study in Rwengwe sub-county Bushenyi District in Uganda on the impact of national agricultural advisory services on household welfare and Results showed that young people were less involved in agriculture particularly in crop farming. In addition, NAADS had positively affected both NAADS and non-NAADS households with more NAADS households reporting positive changes in all the thematic areas under investigation. NAADS was reported to have positively affected agricultural income, food production, volume of agricultural produce sold, access to agricultural information, access to financial services and the general economic welfare.

William Amone, (2013) conducted a study in Uganda on agricultural productivity and Economic Welfare and the Findings from this study revealed that low agricultural productivity (basically in crop farming) has been the biggest challenge to agriculture in Uganda. Agricultural productivity was found to be constrained by lack of capital, pests and diseases, and limited farming skills. Land shortage, bad climate and weather, and limited use of productivity enhancing inputs also limited agricultural productivity; other constraints include poor rural infrastructure, price fluctuation, and post-harvest losses.

Mulubrhan Amare, Jenifer Denno Cisse, Nathaniale D. Sensen and Bekele Shiferaw (2017) conducted a study in Nigeria on the impact of agriculture productivity on welfare Growth of farm Households and the results showed that agricultural productivity is positively associated with labor and farm inputs. Consistent with the inverse land size-

productivity relationship so often observed in the literature, land productivity decreases with increasing farm size. The findings showed that climate risk and bio-physical variables play a significant role in explaining agricultural productivity. Moreover, agricultural productivity has a significant and positive impact on household consumption growth. The results also indicate that while agricultural productivity has a positive impact on welfare growth for non-poor households, it has a negative impact for poor households.

A.G. Laborte, R.A. Schipper, M.K. Van Ittersum, M.M. Van Den Berg, H. Van Keulen, A.G. Prins and M. Hossain (2009) conducted a study in the Northern Philippines on farmer's welfare, food production and environment: A model based assessment of the effects of new technologies Four alternative technologies were evaluated: hybrid rice production (HYR), balanced fertilization strategy (BFS), site-specific nutrient management (SSNM) and integrated pest management (IPM). Possible Impacts of price policies and infrastructure Improvements on technology adoption were assessed. The results show that all four alternative technologies considered are attractive to farmers, although simulations show differential adoption rates for poor, average and better-off households. IPM and HYR appear the most attractive amongst all technologies considered. In all technology simulations, relative profitability and risks, labour and capital requirements and availabilities are decisive factors in the adoption of alternative technologies. Adoption of alternative technologies would result in higher discretionary income, higher rice production and lower biocide use and nitrogen loss. Amongst policy simulations considered, availability of low-cost credit shows the largest Improvements in farmer welfare for poor and average households, but its effect on simulated adoption of alternative technologies was variable.

Geoffrey okobo (March 2010) conducted a study in Uganda on the improved inputs use and productivity in crop farming and economic welfare and results revealed a significant effect improved inputs use on yield but not gross profit. Moreover, farmers who planted recycled seed (of improved variety) without fertilizer obtained lower yield but the highest gross profit (increased their welfare). Furthermore, if the opportunity cost of

own land and labour inputs in crop production were imputed, overall, farmers made economic losses. Based on the prevailing farmers' production technology and market conditions, crop cultivation in the range of 2-3 ha was found to give optimum profit while cultivation under 1 ha or above 4 ha led to economic losses.

Okello and Laker-Ojok (2005) conducted the same study in Northern Uganda and they found out that farmer productivity was significantly influenced by land topography, level of rainfall, incidence of pests and diseases, and infrastructural developments. Other factors found to significantly affect farmer productivity included the level or value of investment in agricultural production inputs.

2.5.0 Research Gaps

2.5.1 Empirical Gap

William Amone, (2013) conducted a study in Uganda on crop farming productivity and Economic Welfare and the Findings from this study revealed that low agricultural productivity (basically in crop farming) has been the biggest challenge to agriculture in Uganda. Agricultural productivity was found to be constrained by lack of capital, pests and diseases, and limited farming skills. Land shortage, bad climate and weather, and limited use of productivity enhancing inputs also limited agricultural productivity; other constraints include poor rural infrastructure, price fluctuation, and post-harvest losses.

However the findings from his study did not show the relationship between crop farming and economic welfare. It is therefore necessary to establish the same study to clearly find out the relationship between crop farming and economic welfare in Wanale sub region Mbale district Uganda.

2.5.2. Contextual Gap

Hyuha et al. (2007) is one the few studies that analyzed farmer productivity from the profit viewpoint on their economic welfare. The study was however limited to just 3 rice growing districts of Tororo, Pallisa and Lira in eastern and northern Uganda. In all these studies cited, however, none appears to have simultaneously considered the impact of crop farming on economic welfare in Wanale sub region Mbale district. It was therefore necessary for the researcher to conduct this study as it was the first study conducted on crop farming and economic welfare in Wanale sub region Mbale district.

2.5.3 Literature Gap

Most of the previous studies that the researcher has viewed lacked enough literature to back up their findings. This study included farmer's productivity and its influence of land topography, level of rainfall, incidence of pests and diseases, infrastructural developments. Other factors found to significantly affect farmer productivity included the level or value of investment in agricultural production inputs, government and non-government support.

2.5.4 Methodological Gap

Most of the related studies conducted on crop farming used only primary data as a method of data collection. It therefore necessary for the researcher to conduct the same study on crop farming and economic welfare in Wanale sub region Mbale district which employed both primary and secondary data: primary data was collected from a sample of 100 respondents and Documentary review was used to collect secondary data which was analyzed using descriptive statistics model and multiple regression method.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the principles and procedures that were applied in this research. It covers the research design, population, sample size, sampling technique, data collection methods, data quality control methods, Details of data analysis and the ethical considerations.

3.1 Research Design

The study employed descriptive research design. Descriptive research design is sufficient for gathering prevailing information on situations for the reason of narration and construal (Salaria, 2012). This kind of research design was appropriate specifically; the study employed Causal Research Design such as quantitative design since it involved an inquiry into the identified/stated problem, based on testing these earlier stated hypotheses as it attempted to measure what impact change in Crop farming had on the indicators of economic Welfare for Wanale Sub Region.

3.2 Population of the study

According to (Ngechu,2004), a population is a well defined set of people, services, elements, and events, groups of things or households that are being investigated to generalize the results. The population for this study was all households engaged in Crop Farming in Wanale sub region.

3.3 Sampling techniques and procedures

The research employed one strategy sampling, namely: purposive sampling technique to enroll respondents for the study. Purposive sampling is the deliberate selection of units of the population constituting a sample which represents the universe. (Kothari,

2004). Purposive sampling was used particularly to sample individuals of Wanale sub-region because they are regular farmers.

3.4.0 Sampling Design

3.4.1 Sampling size determination

A sample is a subset of a population selected to represent characteristics of the population (Nesbary, 2000).This study used a sample of 100 households engaged in crop farming. The reason for the small sample size (100 respondents/households) is that the researcher is well aware that the resources, both time and money are scarcity to reach all farmers (households) in the sub region of Wanale.

The following formula was used to determine the sample size from the population of respondents.

$$n = \frac{Z^2_{a/2}}{e^{2pq}}$$

Where n= sample size

q= 1-p

p= proportion of selected respondents

Z = 1.96 (Obtained from the mathematical table of distribution)

e= maximum possible error, the researcher shall consider an error of 5% deviation from the result.

3.5 Data Collection methods

According to (Kothari 2004, p.95), data collection methods are specific approaches that are applied to obtain information on the research problem. This study focused on the use of primary data that was collected through questionnaires. Carefully constructed questions intended to solve the specific objectives was used for collecting primary data (see appendix I). Carefully selected authentic and published documents were considered as sources of secondary data for this study.

3.6 Data collection instruments

A data collection instrument is a tool that a researcher designs and uses to collect data for a study. (Amin, 2005, p.261). The study used a survey questionnaire. A questionnaire is a form consisting of interrelated questions prepared by the researcher about the research problem under investigation based on the objectives of the study. (Amin, 2005, p.269). A questionnaire was used because it allowed in-depth research, to gain first-hand Information and more experience over a short period of time.

3.7.0 Data Quality management

It is important to emphasize to the quality of data in this study. To this effect, the researcher aimed at satisfying critical conditions of the requirements by ensuring validity and reliability as explained below.

3.7.1 Validity

Validity concerns with the degree to which a finding is judged to have been interpreted in a correct way (Brinberg & Mc Grath, 1985).it is concerned with ensuring that the tools used in the study are well designed to ensure that they measure what they are meant to. The researcher employed the content validity index (CVI) approach to establish validity of the drafted interview guide.

The CVI formula will be;

$$\mathbf{CVI} = \frac{\textit{Number of items considered valid on the draft}}{\textit{Number of items on the draft instruments}}$$

As a rule of the research methodology, the researcher aimed at a CVI of at least 0.7 in accordance with (Amin, 2005). Using the above formula, the researcher ensured that only questions that will be accepted as valid by a minimum of five specialists were considered and a question with less was dropped. Only data from reliable sources was considered for the study.

3.8 Data analysis and procedures

The questionnaires completed underwent editing to check for completeness and consistency. This study used descriptive statistics and regression analysis model in the data analysis. The demographic data was distributed in frequency tables, graphs and pie charts. Descriptive analysis was used to analyze objective one and two and presented in form of mean and standard deviation. Objective three was analyzed through inferential analysis which was done through regression analysis. The analysis of these objectives was guided by the following regression analysis equation:

$$\mathbf{EW = \alpha + \beta_1 CF_1 + \beta_2 MZ_2 + \beta_3 BN_3 + \beta_4 BE_4 + \beta_5 IP_5 + \varepsilon}$$

Where:

EW= Economic welfare (Household income, Employment, Medical Care, Education, Housing facilities), α = Constant, CF_1 = Coffee Growing, MZ_2 = Maize Growing, BN_3 = Banana growing, BE_4 = Beans growing, IP_5 = Irish potato Growing, β_1..... β_5 are regression coefficients of the variables and ε = error term .This analysis was done using SPSS.

3.9 Ethical considerations of the study

Inflicting any physical or psychological harm on anyone during the study was avoided. All rules and laws of the country and for the sub region were obeyed during the study. The following were taken into consideration:-

Plagiarism and fraud. All other people's work referred to in this study have been dully referenced and the authors have been clearly acknowledged.

Confidentiality, privacy and anonymity. All data and information from respondents were kept confidential and solely used for the purpose of this study. No name of any respondent has been included anywhere in this dissertation or on the data collection instruments.

Physical and psychological harm. All questions set in the data collection instruments were pre-tested to avoid imparting any form of harm on the subjects. During interviews, the researcher focused on the targeted aspects of the study; the researcher avoided talking unnecessarily or asking hasty questions. All informants who participated in the study were politely requested to do so after thorough introduction by the researcher.

CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.0 Introduction

This chapter presents the findings of this study, the interpretations and discussions according to the objectives. Based on the methodology chapter (chapter three), data for each objective was analyzed using a unique suitable method, and the results were discretely presented.

4.1.0 Socio- Demographic characteristics of the study population.

Koukouli (2002) defines Socio-demographics as the characteristics of the population. The characteristics include; Age, Gender, Education Levels, Religion among others. This study focused on Age, Gender, Household size and Education level of the respondents in Wanale sub region Mbale district, Uganda.

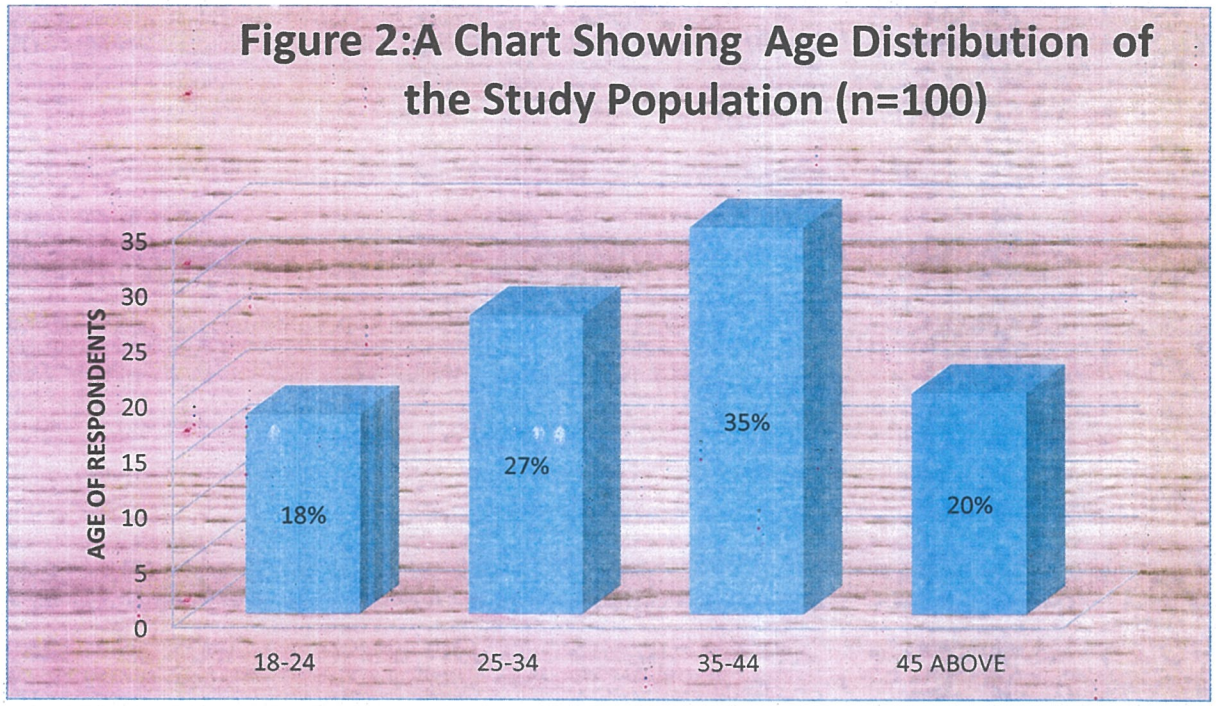
4.1.1 Age Distribution of the respondents

Table 1: shows the age distribution of respondents (n=100)

Age range		Frequency	Percent	Valid Percent
Valid	18-24	18	18.0	18.0
	25-34	27	27.0	27.0
	35-44	35	35.0	35.0
	45 ABOVE	20	20.0	20.0
	Total	100	100.0	100.0

Source: primary data, 2019

Table 1 indicates that the biggest percentage of smallholder farmers is between the age of 35 and 44 (representing 35%), followed by the range of 25 and 34 with a percentage of 27%. The table shows that very few farmers within the range of 18 and 24 and above the age of 45 participate in crop farming with a least percentage of 18% and 20% respectively. This is possible since most young and old people lack the necessary energy for farming.



Source: primary data, 2019

This study revealed that most farmers between the age of 25 and 44 years participate in crop farming as per the graph above. Majority of them are married although many children participate in various farming activities, this study found out that less than 20% of the farmers are aged below 24 years and above 45 years. Probably this is because the respondents considered from each family were mostly household heads. Besides, most children could have been at school at the time of data collection.

4.1.2 Gender of respondents

Table 2: showing the Gender Distribution of the Respondents

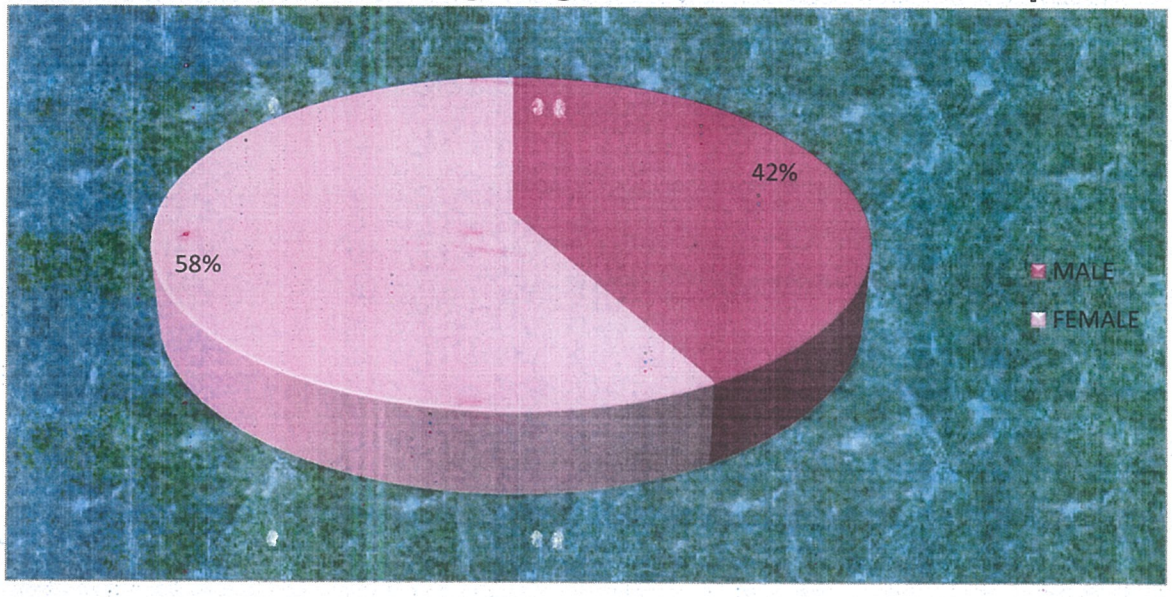
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE	42	42.0	42.0	42.0
	FEMALE	58	58.0	58.0	100.0
	Total	100	100.0	100.0	

Source: primary data, 2019

In Mbale, basically Wanale sub region, both men and women are critically engaged in farming. Although both sexes are involved in plowing and planting, the women spend

more time in the gardens weeding and harvesting. About 58% of the sample farmers in this study were female, implying that there are slightly more women than men who constitute only 42% of the study sample.

Figure 3: A Pie-chart showing the gender distribution of the respondents



Source: primary data, 2019

According to the pie-chart above, the highest numbers of respondents were female with a percentage of 58% and the least number of respondents were Males with 42%.

4.1.3 Formal education of respondents

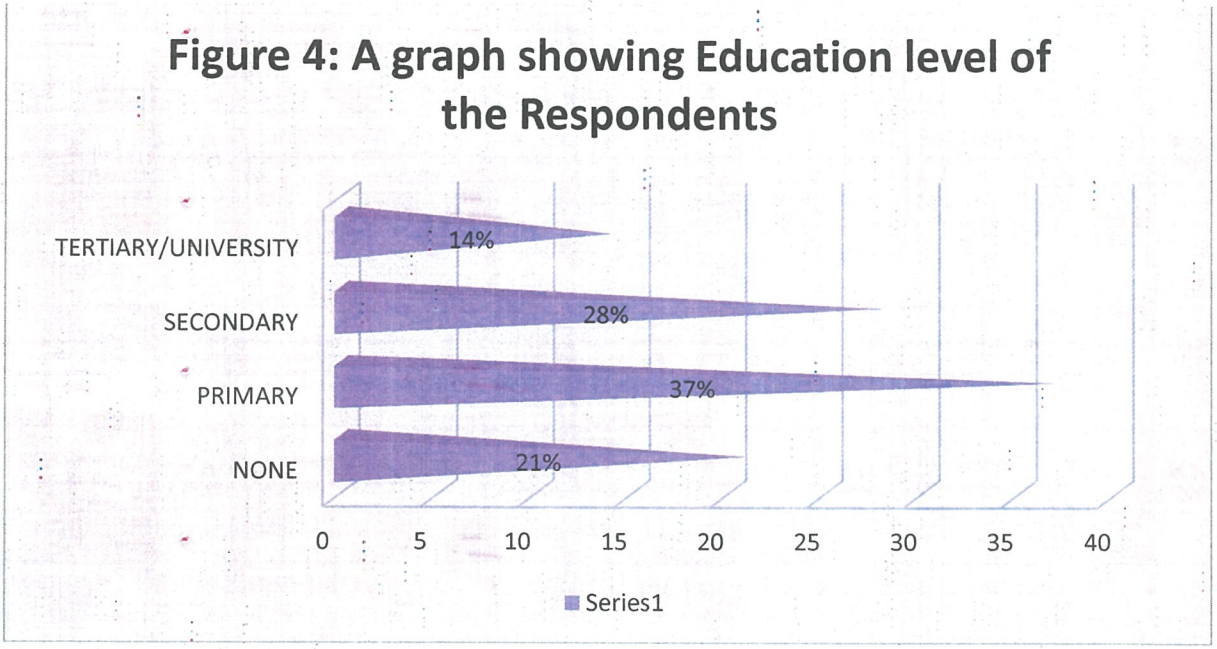
Table 3:Showing Education Level of the Household Head (n=100)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NONE	21	21.0	21.0	21.0
	PRIMARY	37	37.0	37.0	58.0
	SECONDARY	28	28.0	28.0	86.0
	TERTIARY/UNIVERSITY	14	14.0	14.0	100.0
	Total	100	100.0	100.0	

Source: primary data, 2019

MAAIF (2013, pp. 11-17) reported that Ugandan farmers lack adequate education and technical training, and that the few qualified professionals mostly engage in formal employment instead of farming. This study revealed that 37% of smallholder farmers in Wanale sub region only attained primary level, 28% secondary level and 14% have attained tertiary or university level and 21% have not had any technical training in farming.

Figure 4: A graph showing Education level of the Respondents



Source: primary data, 2019

The figure above shows that about 21% of the farmers did not attend any formal education. Only about 37% of the respondents reported that they completed primary education. About 28% of the farmers have completed ordinary level of formal education and only 14% of the respondents had completed Tertiary/ University. The World Bank (2008, pp.202-221) demonstrated a positive association between farm productivity and formal training received by farmers. Low level of education of the farmers appears to undermine the adoption of new technologies by limiting the absorption abilities of the farmers; an aspect that possibly constraints improvement in agricultural crop farming productivity.

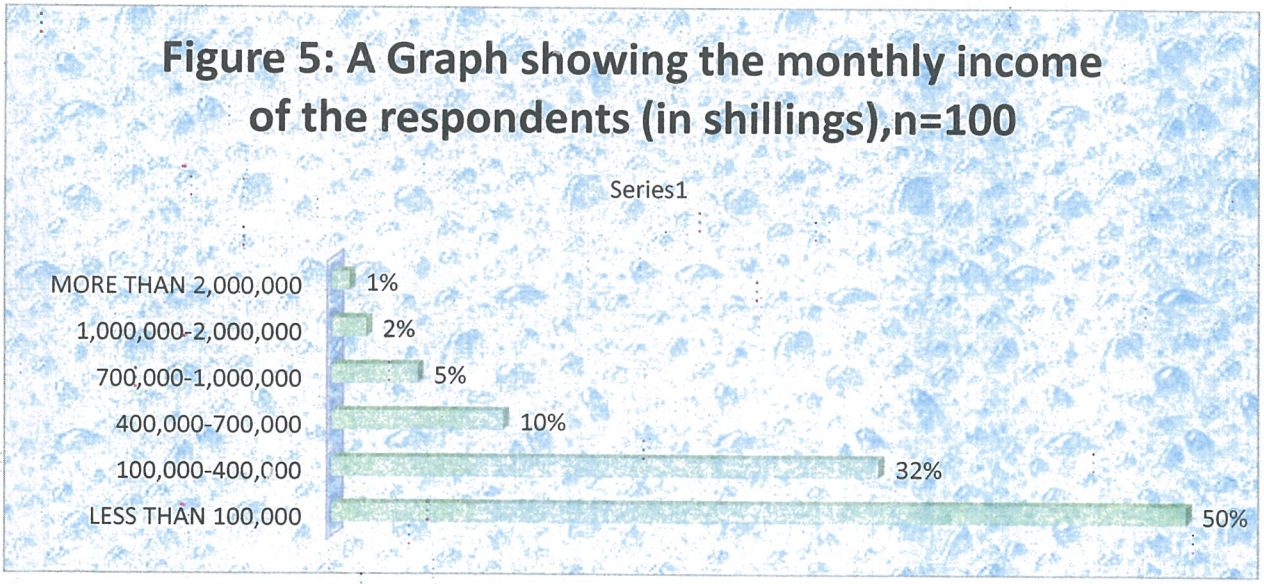
4.1.4 Monthly income of farmers

Table 4: Shows Household Monthly Income of the Respondents (n=100)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	LESS THAN 100,000	50	50.0	50.0	50.0
	100,000-400,000	32	32.0	32.0	82.0
	400,000-700,000	10	10.0	10.0	92.0
	700,000-1,000,000	5	5.0	5.0	97.0
	1,000,000-2,000,000	2	2.0	2.0	99.0
	MORE THAN 2,000,000	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

Source: Primary data, 2019

This study has observed that most farmers in Wanale sub region, Mbale district are poor, they are less educated, and most of them live in detached houses. Most children from the smallholder families walk bare footed and they wear tattered clothes.



Source: primary data, 2019

According to the graph above, majority of the farmers (50%) indicated that they earn less than 100,000 shillings per month. The low income earning of the farmers may be correlated to their subsistence behavior. 32% of the respondent reported that they earn the moderate range of 100,000-400,000 shillings per month. And the rest of farmers who earn more than 500,000 shillings per month are less than 6%

4.1.5 Farmers' access to credit

The cost of credit is high in Uganda, commercial banks' average lending rate is 23% (UBOS, 2014, p. 276). Table 4.2.4 shows the number of times farmers accessed credit in the last 10 years.

Table 5: The number of times a farmer accessed credit in the last 10 years (n=100)

Percent	Percent
Never	77.3
1-2 times	9.2
2-3 times	4.6
More than 4 times	8.8
Total	**100.0**

Source: primary data, 2019

Table 5, shows that about 77% of the smallholder farmers contacted in this study have never accessed credit. The farmers explained that they were unable to access credit due to lack of securities, incapability of repayment, fear of the high interest rate, or non existence of nearby banks. Lack of capital, limited skills and conservativeness makes the application of productivity enhancing inputs including fertilizers, pesticides, and hybrid seed low across the sub region.

This study has witnessed many farmers in Mbale learning and adopting organic farming practices especially in the Wanale sub region of the District. The farmers reported several benefits of organic farming including: (i) environmental friendliness; (ii) improves soil fertility; (iii) increases crop yields; (iv) it is cheaper than buying agrichemicals; (v) makes the crops and soil more resistant to drought; and (vi) it produces natural and healthy foods.

4.2 Main crops grown in Wanale sub region

Table 6: Shows the Main crops (seasonal and perennial) in the sub region of Wanale Mbale district, Uganda with their percentage growth (n=100)

B	Measurement Variable	1	2	3	4	5
	Coffee growing	**SD**	**D**	**NS**	**A**	**SA**
1	Coffee growing is the main Economic activity in this area	24	10	1	22	43
2	I grow Coffee basically for sale and improve my economic Welfare	24	6	3	23	44
3	The type of coffee I grow is resistant from pests and diseases and its highly demanded in all the markets	34	25	1	20	20
4	I always receive free coffee seedlings which is supplied at the district and sub county level	30	22	5	26	17
5	My Coffee yields is of a high quality and Quantity which has increased my income and economic welfare at general	31	24	3	24	18
	Maize Growing	**SD**	**D**	**NS**	**A**	**SA**
1	Maize growing is one of the main food crop growing here in the sub region	11	9	4	26	50
2	I grow maize at substence level (i.e. mainly for home consumption and little or nothing is sold out)	13	13	1	28	45
3	I grow Maize on large scale and it is for commercial Purpose	36	16	8	24	16
4	I afford high yield seeds that are resistant to pest and diseases and can also mature quickly which has increased my income and general welfare	32	27	3	24	18
	Banana farming	**SD**	**D**	**NS**	**A**	**SA**
1	Banana growing is the main food crop here in the area	15	8	11	27	39
2	I grow my bananas for mainly home consumption and the surplus output is sold out	30	25	12	25	8
3	I always use modern means of production like machines, agrichemicals in banana growing and thus has increased more income and living standards	17	15	9	33	26
4	I always receive government support inputs like fertilizers, seeds, irrigation facilities, free farmers seminars which has improved the productivity of banana farming	30	27	9	27	7

	Beans growing	SD	D	NS	A	SA
1	Beans growing is the main food crop and also the main source of income in this area	16	17	2	22	43
2	I afford high yield seeds that are resistant to pest and diseases and can also mature quickly which has increased my income and general welfare	21	22	3	31	23
3	I always use modern means of production like machines, agrichemicals in beans growing and thus has increased more income and living standards	35	23	5	25	12
	Irish potato growing	SD	D	NS	A	SA
1	I grow Irish because it is the main food crop and the main source of income in this area	53	17	3	19	8
2	I grow Irish because of the fertile soils which increases their productivity levels and thus eventually high output and high income generated	54	16	1	21	8
3	I grow Irish also for sale and some is reserved for the next planting season	59	10	2	20	9
4	I always receive government support inputs like fertilizers, seeds, irrigation facilities, free farmers seminars which has improved the productivity of Irish farming	53	18	3	16	10

Source: Primary Data, 2019

Wanale farmers produce various crops and in some cases they integrate with livestock, most of which are for own consumption. Table 6, shows the frequency of the main crops (seasonal and perennial) with their percentage growth grown by farmers in Wanale sub region Mbale district.

Table 6, indicates that the most common crops grown by the smallholders are: maize, beans and bananas. Other crops of great significance are cassava, sweet potatoes, simsim, millet and tomatoes. Table 6, further shows that some smallholders grow cash crops including coffee.

Majority of the farmers strongly agreed that crop farming is one of their main economic activities which have improved their welfare within the settings. A high percentage of 43% of the respondents strongly agreed that they grow coffee as their main economic activity and source of income, 50% of the respondents strongly agreed that they grow maize, 39% Bananas and 43% grow Beans. However majority of the respondents

representing 53% strongly disagreed that Irish potato growing is not one their main crop farming and source of income (economic welfare). Smallholder farms are spread throughout the sub region. This study estimated average smallholder farm size to be 1.2 hectares, though there are even smaller farms especially within the regions.

Farm mechanization and the application of productivity enhancing inputs are not common among the smallholders in the sub region. Most farmers use hand-hoes; farmers reacted that machines such as tractors are not used due to the Mount Elgon movement. Less than 2% of the farmers reported that they use irrigation (the farmers rely mainly on rainfall and other natural factors. Most farmers cannot afford hybrid seeds; they plant traditional seeds that are often low yielding. About 37% of the respondents reported that they use fertilizers.

4.3 External influence of crop farming in Wanale sub region

Table 7: Shows the intermediate variable; Government policy, contribution of NGO's, Infrastructure Development and Climatic change with their percentage growth, (n=100)

C	Measurement Variable	1	2	3	4	5
	Government policy	**SD**	**D**	**NS**	**A**	**SA**
1	The government has promoted agriculture modernization	**33**	**30**	**7**	**21**	**9**
2	The government has reduced income inequalities	**28**	**32**	**13**	**18**	**9**
3	The government has provided markets for my Crop farming output	**26**	**33**	**13**	**22**	**6**
4	Extension Education and research on new technologies	**29**	**37**	**8**	**17**	**9**
5	Political stability, land reforms has created favorable environment for working	**30**	**35**	**13**	**15**	**7**
6	Economic Diversification has been promoted by the government	**30**	**36**	**13**	**13**	**8**
NO	**Contribution of NGO's**	**1**	**2**	**3**	**4**	**5**
1	I have been supported by NGO's in most of my Economic activities	**61**	**15**	**6**	**11**	**7**
2	I have been receiving financial support from NGO's	**62**	**17**	**3**	**11**	**7**
3	NGO's contribute to the training of farmers to improve their efficiency in production	**60**	**12**	**7**	**13**	**8**
4	NGO's should continue supporting the farmers to improve their welfare	**58**	**14**	**5**	**17**	**6**
NO	**Infrastructure development**	**1**	**2**	**3**	**4**	**5**
1	We have better schools around this region	**22**	**35**	**9**	**28**	**6**
2	we have good standard hospitals around this region	**23**	**31**	**6**	**32**	**8**
3	we have large markets for our crop farming output	**23**	**19**	**10**	**31**	**7**
4	There is rural electrification in this area	**39**	**33**	**2**	**19**	**7**
5	We have good roads connecting all sides in this area	**38**	**32**	**3**	**20**	**7**
6	There is good communication networks in this area	**24**	**33**	**4**	**26**	**13**
NO	**Climatic change**	**1**	**2**	**3**	**4**	**5**
1	There is good climatic changes inform of rainfall, wind, temperatures among others which has contributed the growth of crop farming	**15**	**17**	**8**	**46**	**14**
2	We are affected by natural hazards like landslides, mudslides, heavy rainfall, high temperatures among others	**23**	**24**	**6**	**33**	**14**
3	Natural hazards has reduced our output ,income and general welfare	**32**	**26**	**5**	**27**	**10**

Source: primary dada, 2019

From table 7 above, majority of the respondents with about 37% reported that the government has neglected them in providing for them economic incentives, subsidies

and decline to provide socio-economic infrastructures like roads, rural electrification, markets, hospitals and good standard schools which could improve on their crop farming productivity and eventually their welfare. About 62% strongly disagree to have received any NGO support in crop farming. About 46% of the respondents reported unpredictable climate and weather as a strong reason for low farm productivity in their areas. Unpredictable climate and weather in the forms of drought, flood and wind continues to adversely affect farmers in Wanale sub region, but the magnitude of effect varies partially according to the region. Due to reliance on natural factors, farmers in East Africa have become more vulnerable to the impacts of climate change (Lyimo & Kangalawe, 2010).

4.4 Indicators of Economic welfare

Table 8: showing the indicators of Economic Welfare

NO	Household Income	1	2	3	4	5
		SD	D	NS	A	SA
1	I Earn enough money from crop farming	19	38	8	20	15
2	I am able to afford basic goods and services for instance clothing, food, shelter, education and good health standards	17	27	11	23	22
3	Am able to raise tuition fee for all my family in any education level	23	24	10	31	12
4	Incomes generated from crop farming has enabled me to save for future investments	30	24	8	25	13
5	Income earned from crop farming has increased my expenditure and accessories of other goods and services	30	23	8	25	14
	Employment	1	2	3	4	5
1	I am self employed	33	22	3	15	27
2	Am permanently employed by the government	52	26	3	12	7
3	Am temporary employed	51	24	3	16	6
4	I do work from home	40	20	1	16	23
5	I have created jobs for other people by employing them to work in my farms	53	17	3	21	6
	Housing facilities	1	2	3	4	5
1	I leave in a self owned house	26	20	2	17	35
2	I own a permanent house	48	29	1	15	7
3	I own land which has enabled me grow more crops and construct more houses	34	34	1	20	11
4	I use electricity in my house	59	19	1	14	7
5	I own a car, motorcycle, TV, Bicycle in my house	65	19	1	9	6
6	I possess financial asset like a bank account	62	19	2	11	6
	Education	1	2	3	4	5

1	Am able to take my children in good standard schools due to my income	46	23	5	19	7
2	I am able to buy scholastic materials and pay school fees for my children in time	39	29	5	22	5
3	I support my children in high institution of learning	39	28	4	24	5
	Medicare care	SD	D	NS	A	SA
1	Am able to afford better and standard health services	30	35	4	27	4
2	There is better health services in this Sub-region	30	35	0	29	6
3	The government has done enough to provide good health facilities in this area	30	33	1	31	5

Source: primary data, 2019

The support given to smallholder farmers seemed to be too small to change their living conditions. From table 8, Less than 15% of the respondents reported to earn some good income from crop farming while the majority of the respondents representing 75% earn less or nothing from crop farming since they grow basically for home consumption and nothing is kept for sale. About 48% of the farmers reported to have poor housing facilities, poor education systems and medical care as a result of government failure to transfer equal national benefits.

4.5 Farmland access and ownership

Mbale district has fertile soils with 64.5% of its land area suited for agriculture and 27% cultivable (MAAIF, 2017). Table 9 shows how the respondents of this study accessed the farmland that they used and whether they own the land or not.

Table 9: Showing Farmland access and ownership

Access	Percent
Own	64.2
Renting	10.4
Using for free	25.4
Total	**100.0**

As portrayed in table 9, 64.2% of the respondents reported that they own their farmland. Only 10.4% of the respondents indicated that they rent the farmland that they use. About 25.4% indicated that they freely use lands that belong to relatives, friends, in-laws or government. Farmers reported that expansion of cultivated land is becoming unsustainable since access to land is increasingly constrained by high population growth.

4.6 Major constraints to crop farming productivity in Wanale sub region Mbale district, Uganda.

Nabbumba and Bahiigwa (2003) revealed that attempts to raise agricultural crop farming productivity in Mbale district and Uganda as a whole have not been very effective. The modest increases in productivity since 1990 are attributed to expansion of cultivated land rather than improvement in productivity per unit area of land (Nabbumba & Bahiigwa, 2003, p.3; World Bank, 2008). Expansion of cultivated land is becoming unsustainable since access to land is increasingly constrained by high population growth (MAAIF, 2013).

Growth of agricultural crop farming productivity in Wanale sub region and Uganda at large is constrained by several factors. This study has identified 10 major factors that limit farm productivity. The factors were identified based on growth accounting exercise. The factors identified in this study are discussed below.

Capital. About 86% of the respondents of this study reported that lack of capital was a serious constraint to increasing crop farming productivity. Since most smallholders are poor, lack of capital constraints them from acquiring modern equipments, using hybrid seeds, or expansion of farms for those with unutilized land. The farmers often fail to plough their land in time, they cannot afford to buy fertilizers and cannot spray their crops or treat their livestock in case of diseases due to lack of capital. Availability of

capital is further constrained by limited access to bank loans: about 77% of the farmers reported that they have never accessed credit from commercial banks.

Pests and diseases. About 75% of the respondents indicated pests and diseases as a major constraint to agricultural productivity. Nabbumba and Bahiigwa (2003) estimated that pests and diseases cause yield losses of nearly 50% to Ugandan farmers. Producers of maize, beans, bananas, simsim, cassava, millet and coffee reported in this study that these crops are highly susceptible to diseases and pests. Salami et al., (2010) observed that the possibility of chemical control of pests and diseases by smallholder farmers is restricted by limited access to capital, high cost and low availability of pesticide. Farmers often resort to tolerant varieties, which are low yielding (Salami et al., 2010).

Land. Uganda's rapid population increase and the analogous increase in the number of agricultural households have increased land pressure, reducing the size of landholdings per farming household and further threatening their security of tenure. This study shows that the average agricultural household land holding is as low as 1.2 hectares. About 49% of the farming respondents recorded land problems as a key constraint to crop farming production. Land limitation forces farmers to undertake small farming activities, which undermines total factor productivity (Zepeda, 2001; Kokic et al., 2006). The repeated use of a given farmland depletes its fertility making the land less productive.

Farming skills/knowledge. About 72% of the respondents surveyed in this study have never received formal training in agriculture. The study also indicates that most farmers in Wanale sub region lack the required technical skills in farming. This study found that limited farming skill is a serious productivity constraint to about 56% of the smallholder farmers contacted in this study.

Unpredictable climate and weather; drought, flood and wind. About 61% of the respondents reported unpredictable climate and weather as a strong reason for low farm productivity in their areas. Unpredictable climate and weather in the forms of

drought, high rainfall, landslides and wind continues to adversely affect farmers in Wanale, but the magnitude of effect varies partially according to the region. Due to reliance on natural factors, farmers in East Africa have become more vulnerable to the impacts of climate change (Lyimo & Kangalawe, 2010). Poverty appears to constrain the use of irrigation in Uganda.

Labor problem. Shortage and poor quality of labor poses serious constraints to farm productivity in some parts of Wanale sub region. Most farmers interviewed in this study indicated that high cost of labor or their limited availability makes planting, weeding, and harvesting very difficult. According to IFAD (2011), shortage of labor causes delay in planting, weeding or harvesting; bad timing in any of these activities leads to major losses to farmers. About 41% of the farmers contacted during this study reported that labor problems constrained their farm productivity.

Limited application of productivity enhancing inputs. Application of productivity enhancing inputs including fertilizers, pesticides, formulated feeds and hybrid seed is not common among farmers in Wanale sub region. Despite limited application of these inputs, studies including Owuor (2008, p.4), Salami, et al. (2010), and Gray et al. (2014) reported a positive correlation between farm productivity and the amount of the inputs used.

Poor infrastructure. Infrastructure including roads, railways, banks, markets, electricity, and irrigation facilities constitutes key ingredients for productivity and Economic welfare (Lin et al., 2010, pp. 2-3). Lin et al. (2010) observed that both physical and institutional infrastructure affects the development and transfer of technology; for example, irrigation systems and roads may be required to make a technology profitable to implement. Farmers find it very difficult and expensive to transport their products to the markets. They often sell their outputs unprocessed, sometimes from gardens/farms. About 85% of Wanale do not access electricity; even those having access do not receive consistent supply. The absence of electricity in most parts of the region has limited processing of crop farming products, and hence

constrained value addition by farmers. Salami et al., (2010) observed that the poor state of infrastructure has had long-term detrimental effects on productivity growth of smallholders in Uganda. About 34% of the farmers contacted in this study associated their low agricultural productivity due to poor infrastructure.

Lack of government support in the form of subsidies, loans and extensions. According to UBOS (2014a), over the last twenty years, the agricultural sector has been receiving less than 5% of Ugandan government budget allocations. The government allocates more money to security (army), education, health and transport sectors. This study believes that under financing of the agricultural sector limits support to the smallholder farmers in form of subsidies, loans or extensions/trainings are limited. Although the government has been having NAADS, a program intended to support farmers; only about 12% of the respondents of this study reported that they received the support in the form seeds, animals (goats, pigs and cows), fertilizers and specialized trainings. The support given to smallholder farmers seemed to be too small to change their living conditions. Most farmers reported that they received support through farming groups. About 9% of the respondents reported that they received support from various Non-Governmental Organizations (NGOs).

Fluctuation in prices. Uganda experiences fluctuating food prices. This study has observed that prices rise during and after the long dry spells (between December and May) due to scarcity and fall during rainy season. Other factors that perpetuate fluctuation of food prices include low stocks for cereals, changes in fuel prices and fluctuation in the US dollar exchange rates. Farmers interviewed in this study explained that even during scarcity the smallholders do not gain much from increasing prices since they do not store their products.

4.7.0 Relationship between Crop farming and Economic welfare

The study estimated the connection between Crop farming which included; coffee growing, Banana farming, Maize farming, Beans and Irish potato growing and Economic welfare which were determined by Household income, Employment, Medical Care,

Education and Housing facilities. Multiple regression analysis of the equation below was applied using primary data that was collected from the field.

$$EW = \alpha + \beta_1 CF_1 + \beta_2 MZ_2 + \beta_3 BN_3 + \beta_4 BE_4 + \beta_5 IP_5 + \varepsilon$$

Where:

EW= Economic welfare (Household income, Employment, Medical Care, Education, Housing facilities), α = Constant, CF_1 = Coffee Growing, MZ_2 = Maize Growing, BN_3 = Banana growing, BE_4 = Beans growing, IP_5 = Irish potato Growing, β_1..... β_5 are regression coefficients of the variables and ε = error term .This analysis was done using SPSS.

4.7.1 Model Determination

The goodness of fit results is as displayed in Table 10. The regression model provided an R^2 value of 0.480. This implies that the predictors used in this model can explain 48% in variation of dependent variable. The remaining percentage can be accounted by other variables other than those used in this study.

Table 10: Model Summary

Model	R	R. Square	Adjusted R. Square	Std. Error of the Estimate
1	.693[a]	.480	.367	.65817

a. Predictors: (Constant), crop farming; maize, coffee, Beans and Irish potatoes.

4.7.2 Test of Significance

The test of significance was estimated by use of ANOVA as indicated in Table 11. The model gave ANOVA regression sum squares of 9.209 and residual sum square of 9.963. The mean square for regression is 1.842 and a residual mean of 0.433. The output provided an F-statistics value of 4.252 with a p– value of 0.007.

Table 11: Analysis of Variance (ANOVA)

Model	sum of Squares	Df	Mean Square	F	Sig.
Regression	9.209	5	1.842	4.252	.007b
Residual	9.963	23	.433		
Total	19.172	28			

a. Dependent Variable: Economic welfare

b.Predictors: (Constant), crop farming, Maize growing, Coffee, Beans, Bananas and Irish potatoes. This is an implication that all the variables used in the model namely, Maize growing, Coffee, Beans, Bananas and Irish potatoes are significant in predicting the Economic welfare of individuals in Wanale sub region. Therefore, from the results on the overall p – value of F – statistics given, it can be assumed that the model used in the study is significant since the confidence interval used was 95% leaving an allowance of 5%.

4.7.3 Coefficients of the Variables

The results on the regression coefficients of the variables are as indicated in Table 12.

Table 12: Coefficients of the Variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	sig.
	B	**Std. Error**	**Beta**		
(Constant)	-.977	1.063	.	-.915	.370
Coffee growing	.135	.173	.121	.779	.444
Maize growing	.469	.176	.444	2.667	.014
Banana growing	.256	.167	.240	1.534	.139
Bean growing	.034	.143	.042	.240	.812
Irish potato growing	.472	.228	.332	2.071	.050

a. Dependent Variable: Economic welfare

From the coefficient findings provided, it is clear that proper coffee growth has a major effect on the economic welfare as it gave a coefficient value of 0.444 (t = 44 2.667) and a p – value of 0.014. Similarly, Irish potato growing has a significant impact on the economic welfare of individuals with a coefficient value of 0.332 (t = 2.071) and a significance level of 0.05. However, coffee growing, Banana growing and Beans growing seems not to have significance in predicting achievement of economic welfare as they provided coefficient values of 0.121 (0.779) and a p –

value of 0.444, 0.240 (t = 1.534) and a p – value of 0.139, and 0.042 (t = 0.240) and a p – value of 0.812. Therefore, from the findings it can be concluded that economic welfare can be improved through proper growth of coffee and Maize.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

Based on the findings of this study presented in chapter four, this chapter provides a summary of the main results, the conclusions and the suggested recommendations. The chapter is succinctly written and organized according to the study objectives.

5.1 Summary of the main findings

This study attempted to understand and explain the performance of Crop farming in Wanale sub region Mbale district, Uganda. The study particularly focused on production and productivity of the rural base smallholder farmers who account for over 55% of agricultural output in the district, but remain underprivileged.

This study found that both sexes are involved in Crop farming, the study has observed that women do more farm work than men. This study revealed that most farmers in Wanale sub region are adults of 25 years and above, majority of whom are married; the farmers lack adequate education and technical training: less than 20% of the respondents received technical training in farming. Most farmers contacted in this study were found to be poor, earning less than 100,000 shillings per month. The farmers lack capital and they hardly have access to bank loans; about 77% of them indicated in this study that they have never taken bank loans due to lack of collaterals, inability of repayment, fear of the high interest rate or non existence of nearby banks.

This study estimated the average smallholder farm size in Wanale sub region to be less than 1.2 hectares. The farmers contacted in this study were found to produce various crops often integrating with livestock. The most common crops grown in Wanale sub region include: maize, beans, bananas. Other crops of great significance are cassava, sweet potatoes, simsim, millet and tomatoes. Some smallholders were found to produce cash crops including coffee.

Farm mechanization and the application of productivity enhancing inputs such fertilizers, pesticides, and hybrid seed were found to be low among the farmers. This study observed that most farmers in Wanale sub region use hand-hoes; only about 0.1% had access to tractors. Less than 2% of the farmers contacted indicated that they use irrigation; the farmers rely mainly on rainfall.

The study also revealed 10 major factors that constraint the growth of farm productivity in Wanale sub region and Mbale district as a whole. The key factors are: (i) capital which restraints smallholder farmers from acquiring modern equipments, using hybrid seeds, or expanding their farms; (ii) pests and diseases that sometimes cause yield losses of up to 50%; (iii) limited farming skills/knowledge due to deficient education; and (iv) land problems due to rapid population increase and the analogous increase in the number of agricultural households. Other constraints identified include: (v) bad climate and weather due to reliance on natural factors which make the farmers vulnerable to the impacts of climate change; (vi) labor problems in the form high cost or their limited availability that makes planting, weeding, and harvesting very difficult; (vii) limited application of modern inputs due to limited knowledge, poverty and conventionality. Other factors include; (viii) poor infrastructure such as bad roads and railways; (ix) low government support in the form of subsidies, loans and extensions; (x) fluctuation of crop farming prices and (xi) post harvest losses.

The results of the predictor model on the relationship between the independent and dependent variables indicated that all the factors used in this study put together have an influence on Economic welfare. The regression model provided an R^2 value of 0.480. Which means that the independent variables used in this model can explain 48% in variation of dependent variable. The model output provided an F-statistics value of 4.252 with a p – value of 0.007. On the coefficient results, coffee growing has a significant influence on economic welfare as it provided a coefficient value of 0.444 (t = 2.667) and a p – value of 0.014. Likewise, Irish potato growing indicated a significant effect on the economic welfare with a coefficient value of 0.332 (t = 2.071) and a significance level of 0.05.

5.2 CONCLUSION

Based on the findings, crop farming production in Wanale sub region is mostly undertaken by smallholders whose average farm size is less than 1.2 hectares. The farmers produce various crops often integrating with livestock, most of which are for own consumption. Due to poverty and limited skills; farm mechanization and the application of productivity enhancing inputs were found to be minimal in the sub region. The farmers rely mainly on rainfall and other natural factors for farming.

This study believes that the biggest challenge of wanale's sub region crop farming is low farm productivity. The study has determined that crop farming productivity is constrained by lack of capital, pests and diseases, and limited farming skills. Land shortage, bad climate and weather, and limited use of productivity enhancing inputs also limit productivity. Other factors that were found to constrain productivity include poor rural infrastructure, low government support to farmers, price fluctuation, and post-harvest losses.

5.3.0 POLICY RECOMMENDATIONS

5.3.1 Policies for improving crop farming productivity in Wanale sub region Mbale district, Uganda

Stamoulis and Zezza (2003, pp.25-33) opined that for national development strategies to be successful, food security must be part of the mainstream national, regional or local policy design and their implementation, and that promotion of rural development should be a key component of such strategies. Achieving rural development requires sustainable strengthening of agricultural crop farming productivity and competitiveness (World Bank, 2008, pp.18-19).

Stemming from these views, for Crop farming to be effective in reducing poverty, unemployment and income inequality, the poor must contribute to deliver economic welfare and they must also benefit from the welfare process. Given Uganda's setting

where majority of the poor who reside in the rural areas depend on agriculture for livelihoods, enhancing agricultural crop farming productivity must be a prime target in any national policy design for sustainable economic welfare. The subsequent section presents the suggested ways of raising crop farming in Wanale sub region Mbale district:-

Resource support for farmers. As previously elicited in this study, a major constraint to growth of agricultural productivity in Wanale sub region is lack of capital for acquiring modern equipments, buying hybrid seeds, or expansion. Unfortunately, the unrelenting underfunding of agricultural crop farming in Uganda implies that public support extended to the farmers cannot adequately foster improvement in their livelihood and farm productivity. Efficient resource reallocation through structural adjustment or otherwise may be appropriate to anchor crop farming growth. In case of natural hazards, assistance programs such as drought, landslides assistance should be introduced to provide farming incentives and to act as a safety-net to the victims.

Access to assets. There is need to improve access by the smallholders to various assets and also to involve them in decision making processes, especially on issues that influence their lives. Government should provide low interest loans to farmers with minimum requirements since most farmers do not have the required collaterals for loans. Given that most farm land in Wanale sub region and Uganda as whole is not registered, the government should subsidize land registration and expedite the process of formal land documentation. Government should also invest in expensive farm equipment including tractors, and avail them for hire at affordable cost at every sub-county. These may enable timely land opening and foster cheaper farm expansion by the smallholders.

Investment in Research, Development and Extension (RD&E) system. Rivera and Qamar (2003) showed that investing in rural R&D is critical to increasing productivity, sustainability and resilience of rural farm activities. Public investment in R&D and effective and timely extension activities will foster adoption of such

innovations on the latest technologies by farmers. Several studies that examined the return to public investments in R&D and extension in agriculture including Mullen (2007) and World Bank (2008, p.14) showed high rates of return. Although both domestic and international R&D findings should be used, this study believes that domestic findings may lead to more tailored and suited policies to the local conditions. This study envisions that future agricultural productivity growth in Uganda may depend on the capacity of rural RD&E systems to holistically supply innovations to a diverse section of rural individuals in Wanale sub region. This study recommends that agriculture R&D should focus on high yielding varieties, and pests and disease control.

Rigorous use of productivity enhancing inputs. Donovan (2012) recognized productivity enhancing inputs including hybrid seeds, fertilizers, and pesticides as the major embodiment of modern scientific farming. Smallholder farmers in Wanale sub region Mbale district still underutilize productivity enhancing inputs despite their positive correlation with agricultural productivity. This study believes that addressing the low use of productivity enhancing inputs may require an integrated approach. The study suggests that government of Uganda should subsidize productivity enhancing inputs so as to make them more affordable to farmers. Subsidies will overcome temporary market failures, reduce risks and offset fixed costs. The inputs should be made available in the rural areas and their benefits should be well communicated to farmers.

Rural infrastructural investment and development. AfDB (2013) explained that the magnitude of smallholder supply response to trade and price changes depend on, among other factors, rural infrastructure, rural finance, and research. This study has witnessed that rural infrastructure is very poor in Wanale sub region. The significance of rural infrastructure and their unrelenting deficiency in the district implies government of Uganda must invest in them in order to reduce the cost of doing business and to take advantage of trade reforms. The government should open and maintain roads, install irrigation facilities, expand access to electricity, and improve communication services, both in the rural and urban areas.

A model for promoting productivity and commercialization of agriculture is an important economic sector in Uganda in terms of food and nutrition security, employment, income, raw materials for industries and exports to regional and international markets (MFPED, 2015, p.19). This study has observed that the main problem faced by famers in Wanale sub region is low agricultural productivity. Given the combination of low productivity and large share of workers in agriculture; this study sees an urgent need to transform the agriculture sector in order to achieve the goals of eradicating poverty and generating shared prosperity. This study proposes a model approach that attempts to augment the capacity of smallholder farmers in order to increase their farm productivity, increase their income and to enable the achievement of inclusive economic welfare in the sub region. The proposed name for the approach is Smallholder Hybrid Triangle (SHT). SHT is a biosystems approach intended to enable smallholder farmers to diversify their livelihoods by concurrently keeping livestock, growing crops, and planting trees, both for subsistence and commercial purposes.

Improving access to quality education in rural areas. This study believes that provision of quality education in the rural areas where majority of Ugandans live will promote inclusive economic welfare by unlocking opportunities for those who are deprived; hence closing the urban rural income gap. Inequity in the allocation of education resources in Uganda appears to perpetuate weaker education outcomes. This study advocates for further efforts to ensure uniform financing of education in Uganda. Given the pervasive corruption vice, there should be strict monitoring of government spending on both UPE and USE.

Improving health status of individuals. According to Ministry of Health (2015), Uganda's burden of diseases remains predominantly communicable, although there is a growing burden of non-communicable diseases (NCDs) including mental health disorders. Key communicable diseases include HIV/AIDS, Hepatitis B, Measles, Tuberculosis, Ebola and Flu. Maternal and prenatal conditions also contribute to high mortality. Neglected tropical diseases (NTDs), particularly malaria remain a big problem in the country. This study suggests that the government of Uganda should lead the

process of healthcare and prevention or treatment of diseases, by undertaking the following: - (i) Develop comprehensive advocacy packages to increase community awareness and strengthen institutional capacity to develop health promotion programs and implementation of appropriate interventions. Government should provide technical support for health behavior change communication, health education, social mobilization, and advocacy in health programs. (ii) Support an integrated approach to diseases control focusing on case management, strengthening diagnostics; integrated vector control e.g. for malaria, intermittent preventive treatment in pregnant women; and early epidemic detection and response. (iii) Support and maintain HIV prevention, treatment, testing and care services. (iv) Strengthening partnerships to increase access to integrated services that will enable attainment of NTD control, and eradication goals.

Promoting economic diversification outside agriculture in rural areas. Transformation of Uganda from an agrarian society into a middle income country requires deeper diversification of rural economic activities (World Bank, 2012, p.22). This study believes that diversification of non-farm activities can be enabled by a policy environment that promotes entrepreneurship and the growth of new industries. This study suggests that government of Uganda should encourage the development of new businesses in both urban and rural areas. The study views policy measures that foster delivery and access to finance in rural areas as paramount for growth of young firms. Other potential sectors for propelling economic welfare in the rural areas that should be targeted include tourism.

In view of the above, this study suggests the government of Uganda should aim to achieve a broad-based improvement in the living standards of all, while at the same time maintain rapid economic welfare. The government should attempt to create equal access to development opportunities for everyone; it should establish a system for guaranteeing social equity with a focus on ensuring fairness in rights, rules and distribution; and should remove obstacles that deter people from participating in economic welfare or sharing its benefits. In order to achieve greater levels of

productivity and prosperity, this study sees the need for advanced development of human resources.

5.4 Recommendations for further Research

This study highlighted several areas within the scope of this study where it found only scanty information during literature search. Whilst the study attempted to address some of them in this dissertation, others remain. For instance, due to absence of a unified definition and measurement of Economic welfare, there is lack of robust data to measure, monitor and evaluate Economic welfare in Uganda. While recognizing the limitations of this research, especially the methods of analysis, this study identified the following areas in which further research may be beneficial: -

- Agricultural crop farming productivity of large scale farmers in Uganda.
- How to implement Economic welfare programs in Uganda.
- The effects of Government policies on crop farming.
- The relationship between culture Diversification and Economic welfare in Uganda.

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APPENDIX I: QUESTIONNAIRE

Kampala International University

P.O .Box 20000, Kampala Uganda

Tel:+256-414-266813

Website: www.kiu.ac.ug

Date.....

Dear Respondent,

RE: QUESTIONNAIRE FOR FARMERS

I am a student of Kampala International University undertaking a research which is part of my Degree study program. The research aims at assessing the contribution of crop farming on economic welfare in Wanale sub region in Mbale district.

As a process of data collection for this research, I am requesting you to provide me with some information. This can easily be done by filling the following questionnaire.

Please answer the questions as honestly as possible; the information you give will be treated with maximum confidentiality and solely for the purpose of this research.

Thank you

Wabomba Kadir

A Degree student, KIU

SECTION A. GENERAL QUESTIONS

1. Age of the household head

   1. 18-24 ☐ 2. 25-34 ☐

   3. 35-44 ☐ 4.above ☐

2. Gender of the household head

   1. Male ☐ 2. Female ☐

3. Number of household members ☐

4. Are all household members' aged 6 to 20 Years currently in school?

   1. Yes ☐ 2. No ☐ 3. Yes but not all ☐

5. What is the structure of the household leadership?

   1. Both male and female headed ☐ 2. Female heade ☐
   only

   3. Male headed only ☐

6 What is the marital status of the household head?

   1. Single (never married) ☐ 2. Married ☐ 3. Widowed ☐

   4. Divorced ☐ 5. Separated ☐

7 If married in question (6) above, what is the marriage status of the male head/spouse?

   1. Married polygamous ☐ 2. Married monogamous ☐

8 Education level of the household head

   1. None ☐ 2. Primary ☐

   3. Secondary ☐ 4. Tertiary/University ☐

9 What type of accommodation do you live in?

   1. Detached house ☐ 2. Servant quarters ☐

   3. Tenement (Muzigo) ☐ 4. Others ☐

10 Does the household own this accommodation?

   1. Yes ☐ 2. No ☐

11. What is your average monthly income (in shs)?

Code	monthly income(in shs)		Code	monthly income (shs)
1	less than 100,000		4	700,000-1,000,000
2	100,000-400,000		5	1,000,000-2,000,000
3	400,000-700,000		6	more than 2,000,000

SECTION B: INDEPENDENT VARIABLE, CROP FARMING

Please indicate how much you agree or disagree with each of the following statements using the scale given below:

1=Strongly Disagree (SD), 2= Disagree (D), 3=Not sure (NS), 4=Agree (A), 5=Strongly Agree (SA)

B	**Measurement Variable**	**1**	**2**	**3**	**4**	**5**
	Coffee growing	**SD**	**D**	**NS**	**A**	**SA**
1	Coffee growing is the main Economic activity in this area					
2	I grow Coffee basically for sale and improve my economic Welfare					
3	The type of coffee I grow is resistant from pests and diseases and its highly demanded in all the markets					
4	I always receive free coffee seedlings which is supplied at the district and sub county level					
5	My Coffee yields is of a high quality and Quantity which has increased my income and economic welfare at general					
	Maize Growing	**SD**	**D**	**NS**	**A**	**SA**
1	Maize growing is one of the main food crop growing here in the sub region					
2	I grow maize at substence level (i.e. mainly for home consumption and little or nothing is sold out)					
3	I grow Maize on large scale and it is for commercial Purpose					
4	I afford high yield seeds that are resistant to pest and diseases and can also mature quickly which has increased my income and general welfare					
	Banana farming	**SD**	**D**	**NS**	**A**	**SA**
1	Banana growing is the main food crop here in the area					
2	I grow my bananas for mainly home consumption and the surplus output is sold out					

3	I always use modern means of production like machines, agrichemicals in banana growing and thus has increased more income and living standards					
4	I always receive government support inputs like fertilizers, seeds, irrigation facilities, free farmers seminars which has improved the productivity of banana farming					
	Beans growing	**SD**	**D**	**NS**	**A**	**SA**
1	Beans growing is the main food crop and also the main source of income in this area					
2	I afford high yield seeds that are resistant to pest and diseases and can also mature quickly which has increased my income and general welfare					
3	I always use modern means of production like machines, agrichemicals in beans growing and thus has increased more income and living standards					
	Irish potato growing	**SD**	**D**	**NS**	**A**	**SA**
1	I grow Irish because it is the main food crop and the main source of income in this area					
2	I grow Irish because of the fertile soils which increases their productivity levels and thus eventually high output and high income generated					
3	I grow Irish also for sale and some is reserved for the next planting season					
4	I always receive government support inputs like fertilizers, seeds, irrigation facilities, free farmers seminars which has improved the productivity of Irish farming					

SECTION C: INTERMEDIATE VARIABLE; GOVERNMENT POLICY, CONTRIBUTION OF NGO'S, INFRASTRUCTURE DEVELOPMENT AND CLIMATIC CHANGE

Please indicate how much you agree or disagree with each of the following statements using the scale given below:

1=Strongly Disagree (SD), 2= Disagree (D), 3=Not sure (NS), 4=Agree (A), 5=Strongly Agree (SA)

C	**Measurement Variable**	1	2	3	4	5
	Government policy	**SD**	**D**	**NS**	**A**	**SA**
1	The government has promoted agriculture modernization					
2	The government has reduced income inequalities					
3	The government has provided markets for my Crop farming output					
4	Extension Education and research on new technologies					
5	Political stability, land reforms has created favorable environment for working					
6	Economic Diversification has been promoted by the government					
NO	**Contribution of NGO's**	**1**	**2**	**3**	**4**	**5**
1	I have been supported by NGO's in most of my Economic activities					
2	I have been receiving financial support from NGO's					
3	NGO's contribute to the training of farmers to improve their efficiency in production					
4	NGO's should continue supporting the farmers to improve their welfare					
NO	**Infrastructure development**	**1**	**2**	**3**	**4**	**5**
1	We have better schools around this region					
2	we have good standard hospitals around this region					
3	we have large markets for our crop farming output					
4	There is rural electrification in this area					
5	We have good roads connecting all sides in this area					
6	There is good communication networks in this area					
NO	**Climatic change**	**1**	**2**	**3**	**4**	**5**
1	There is good climatic changes inform of rainfall, wind, temperatures among others which has contributed the growth of crop farming					
2	We are affected by natural hazards like landslides, mudslides, heavy rainfall, high temperatures among others					
3	Natural hazards has reduced our output ,income and general welfare					

SECTION D: DEPENDENT VARIABLE (ECONOMIC WELFARE INFORM OF HOUSEHOLD INCOME, EMPLOYMENT, MEDICARE, EDUCATION AND HOUSING FACILITIES).

NO	**Household Income**	1	2	3	4	5
		SD	D	NS	A	SA
1	I Earn enough money from crop farming					
2	I am able to afford basic goods and services for instance clothing, food, shelter, education and good health standards					
3	Am able to raise tuition fee for all my family in any education level					
4	Incomes generated from crop farming has enabled me to save for future investments					
5	Income earned from crop farming has increased my expenditure and accessories of other goods and services					
	Employment	1	2	3	4	5
1	I am self employed					
2	Am permanently employed by the government					
3	Am temporary employed					
4	I do work from home					
5	I have created jobs for other people by employing them to work in my farms					
	Housing facilities	1	2	3	4	5
1	I leave in a self owned house					
2	I own a permanent house					
3	I own land which has enabled me grow more crops and construct more houses					
4	I use electricity in my house					
5	I own a car, motorcycle, TV, Bicycle in my house					
6	I possess financial asset like a bank account					
	Education	1	2	3	4	5

1	Am able to take my children in good standard schools due to my income					
2	I am able to buy scholastic materials and pay school fees for my children in time					
3	I support my children in high institution of learning					
	Medicare care	**SD**	**D**	**NS**	**A**	**SA**
1	Am able to afford better and standard health services					
2	There is better health services in this Sub-region					
3	The government has done enough to provide good health facilities in this area					

Thank you for your cooperation

APPENDIX II: INTERVIEW GUIDE

1. Describe the location of your farm.
2. Tell me about yourself.
3. How big is your farm?
4. Which farming activities do you undertake?
5. List the inputs that you use in your farm. If there are inputs that you do not use, explain why you have not been using them.
6. For those missing or not functional, how have they limited your farming business or its productivity?
7. Describe the quality of infrastructures or government services existing around your farm.
8. Do you practice organic farming? If yes, briefly explain how the organic farming has helped to improve your farm productivity. What problems associated with organic farming practices?
9. Which factors commonly limit/constrain your farm productivity?
10. Explain how each of the factors has been a limitation (problem) to your farming activities.
11. In your view what should be done to increase farm productivity in your area?
12. What proportion of your output do you sell for money? How can the marketed proportion be increased?
13. Have you ever been supported by the government or NGOs on farming? If yes, state the support(s) that you received? Explain how the supports boosted your farming business or its productivity.
14. How can you describe the effectiveness of NAADS implemented by the Ugandan government?
15. Apart from farming which other economic activities do you do that earn you money?

THANK YOU FOR YOUR VALUABLE TIME

APPENDIX III: RESEARCH TIME FRAME

vity	DEC-FEB	MAR-JUN	JUNE
posal development			
rections			
a Collection			
a analysis			
mission of final thesis			

APPENDIX IV: MBALE MAP