AGRICULTURAL PRODUCTIVITY AND ECONOMIC DEVELOPMENT IN UGANDA: AN INCLUSIVE GROWTH ANALYSIS

BY

WILLIAM AMONE

Reg. Number: 2013/PhD(Econ)/088/PS

Supervisors

Professor Makombe Godswill

University of Limpopo

Professor Kamuganga Dick

Uganda Technology & Management University

A PhD proposal submitted in fulfillment of the requirements for the award of Doctor of Philosophy in Economics of Mbarara University of Science & Technology

August, 2014

DECLARATION

I, William Amone, declare that to the best of my knowledge, this proposal is my original work and it has never been presented for consideration of any certification at this or any other university or institution of higher learning. This research proposal has been complemented by referenced sources duly acknowledged.

Student's signature..... Date: 15th August, 2014

Name: **William Amone**

Reg. Number: **2013/PhD(Econ)/088/PS**

Supervisors: This proposal has been submitted for appraisal with our approval as University Supervisors.

Supervisor: .....

Professor Makombe Godswill

University of Limpopo

Supervisor: .....

Professor Kamuganga Dick

Uganda Technology & Management University

TABLE OF CONTENTS

Cover Page ……1
Declaration ……2
Table of contents ……3

Chapter One: Introduction ……5

1.1 Introduction 5
1.2 Background to the study 5
1.3 Statement of the problem 10
1.4 Study objectives..... 11
1.5 Research questions..... 11
1.6 Hypotheses of the study 12
1.7 Conceptual framework ……14
1.8 Significance of the study 15
1.9 Justifications of study……16
1.10 Scope of the study ……17
1.11 Operational definitions 18

Chapter Two: **Literature Review……20**

2.1 Introduction 20
2.2 Theories and perspectives of economic development ……20
2.2.1 Development theories……20
2.2.2 Economic development perspectives……23
2.3 Holistic measures of economic development and capabilities……25
2.3.1 The Human Development Index (HDI) ……26
2.3.2 Inequality adjusted Human Development Index (IHDI) ……27
2.3.3 The GNI per capita……27
2.3.4 The Gini Coefficient ……28
2.4 Agriculture, agricultural productivity, and economic development ……28

2.4.1 Agriculture and economic development.....29
2.4.2 Agriculture and economic development policies..... 30
2.4.3 Agricultural productivity ……31
2.4.3.1 Meaning and measurement of Agricultural productivity……...31
2.4.3.2 Agricultural productivity trends in Uganda……...…33
2.5.1 The inclusive growth framework ……..……...…35
2.5.2 Determining the binding constraints to Inclusive Growth 37
2.5.2 Measuring inclusive growth 39

Chapter Three: Methodology ……41

3.1 Introduction 42
3.2 Research design.....42
3.3 Data collection methods 42
3.4 Study population ……..…….43
3.5 Study sample…….…….43
3.6 Sampling strategy……..…….……43
3.7 Data type and sources 44
3.8 Data quality control 45
3.9 Data analysis 46
3.10 Logistical and ethical considerations of the study……50

References 51
Appendix I: Questionnaires ……..…..54
Appendix II: Interview Schedule ……60
Appendix III: HRV Growth Diagnostics 61
Appendix IV: Work plan and timeframe ……..……..……62
Appendix V: Research Budget ……63

CHAPTER ONE

1.0 INTRODUCTION

1.1 Introduction

This study will scrutinize the impact of agricultural productivity on economic development in Uganda. Uganda's agricultural productivity will be considered as the independent variable while economic development will be the dependent variable. This chapter will cover background to the study, the statement of the problem, general and specific objectives, the research questions, the hypotheses, the conceptual framework, the scope of the study, the significance of the study, justifications of the study and operational definitions of terms and concepts.

1.2 Background to the Study

Globally, agriculture plays a crucial role in most economies especially those of developing countries. It provides the main source of food, income and employment to the rural populations. Improvement in agriculture and its productivity is fundamental to achieving food security, poverty alleviation and overall sustainable economic development (see United Nations, 2014). According to the World Bank (2014), over 70 percent of the world's poor live in rural areas, and agriculture is their main source of income and employment.

Nearly 870 million people out of the world's 7.1 billion, (one out of eight) were suffering from chronic undernourishment in 2010-2012. Almost all the hungry people (852 million) live in developing countries, representing 15 percent of the population of developing counties. There are 16 million people undernourished in developed countries (FAO, 2012). The World Bank (2014) also estimates that about 2.4 billion people lived on less than US $2 a day in, the average poverty line in developing countries.

According to the World Bank (2014), in Africa, agriculture employs 65 percent of the labor force and accounts for 32 percent of gross domestic product. Agriculture is essential for sub-Saharan Africa's growth and for achieving the Millennium Development Goal of halving poverty by 2015. A higher and sustained growth requires attention to five core areas of public action: (i) Facilitating agricultural markets and trade; (ii) Improving agricultural productivity; (iii) Investing in public infrastructure for agricultural growth (iv) Reducing rural vulnerability and insecurity; and (v) Improving agricultural policy and institutions.

In many developing countries agriculture is a significant source of food for citizens and a means of livelihood for the most vulnerable members. Raising agricultural productivity is an important policy goal for concerned governments and development agencies. (Kuku, Ajibola, & Saweda, 2011).

Most literatures seem to conclude that investments in agriculture and rural development, both private and public, stimulate economic growth and development. According to IFAD (2013), good agricultural performance was very important in reducing poverty and hunger rates in the more successful countries. Agricultural growth also has a high poverty reduction pay-off than non-agricultural growth or investments. (World Bank, 2008).

Uganda is a landlocked country in East Africa with a total population of about 37 million people. (UBOS, 2014). It has a total area of 241,550.7 square kilometres (sq. km) of which 41,743.2 sq km are open water and swamps, and 199,807.4 sq km is land. Just like most African counties, Uganda is blessed with fertile soils, ample rainfall and a number of valuable natural resources. (see UBOS, 2013). Over the last 20 years, the Ugandan economy has achieved high GDP growth rates. Real economic growth averaged 7 percent. The high performance of the economy has been

accompanied by structural changes, with a steadily declining share of agriculture and increasing shares of industry and services. (MFPED, 2013)

Uganda still faces considerable challenges in meeting its poverty eradication objective of reducing absolute poverty to less than 10% of the population by 2017 and to improve the wellbeing of all Ugandans. The proportion of the national population living below the poverty line fell from 56% in 1992 through 44% in 1997 to 35% in 2000. It rose to 38% in 2003, but declined to at 31% in 2009. (UBOS, 2009). Currently, about 24.5 percent (7.5 million) of the population are below the national poverty line. (UBOS, 2013).

Uganda's rural areas account for 85 percent of the population and 94.4 percent of the poor, while urban areas account for 15 percent of the population but only 5.6 percent of the poor. Analysis of household incomes also reveals that 20% of the richest households share 71% of total income, while the poorest 20% of households share only 2%. The country's Gini coefficient is on average 0.42. This reflects a relatively high level of income inequality. (MFPED, 2011)

Uganda's agriculture employs about 73 percent of all workers in the country while only generating less than 15 percent of the economic output of the country. Those engaged in agriculture are primarily rural based having a lower standard of living than those working in other sectors of the economy. (IFPRI, 2012)

The country's agriculture is characterized by smallholder farming with hand hoe as the major production tool. Farmers produce various commodities, mostly for own consumption. The major food crops include plantains (bananas), maize, millet, sorghum, cassava, potatoes, and rice as staples, and also a range of pulses, fruits, and vegetables. Yields are uniformly low across all of

these commodities. 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. Agriculture is mainly rain-fed, and rainfall in most parts of Uganda is plentiful and allows for double cropping, especially in the Central and Western parts of the country. (IFAD, 2013).

The government of Uganda has over the years attempted to promote agriculture through its development plans, however, success has been painfully low. The key policy interventions that have targeted agriculture include: 1) Plan for Modernization of Agriculture (PMA) (2000 - 2010) that sought to transform subsistence agriculture to commercial agriculture for poverty reduction. 2) Agricultural Sector Development Strategy and Investment Plan (DSIP), (2010-2015). It replaced the PMA with a mission to "Transform subsistence farming to commercial agriculture", by increasing rural incomes and livelihoods and improving household food and nutrition security. 3) The National Agricultural Advisory Services (NAADS): it was created in 2001 to address constraints of lack of access to agricultural information, knowledge and improved technology among rural poor farmers in the country. (IFPRI, 2012; MAAIF, 2014)

Much as limited technology, pests and diseases limit agricultural productivity in Uganda (see Nabbumba & Bihiigwa, 2003), the poor performance of agriculture is also exacerbated by poor implementation of agricultural support programs (such as PMA, DSIP and NAADS) and the neglect of the sector in development priories by the government. Neglect of agriculture and the bias towards investment in urban industrial economy can be traced historically to the misplaced emphasis on rapid industrialization via import substitution and exchange rate overvaluation. (Todaro & Smith, 2011).

The modest increases in aggregate crop production have been achieved from the expansion of cultivated land rather than increased investment in production technologies to raise crop yields per unit area of land. As access to land is increasingly constrained by high population growth, further expansion of cultivated land will be unsustainable in Uganda. (IFPRI, 2008).

According to the Human Development Report (HDR) 2013, Uganda's Human Development Index (HDI) for 2012 was 0.456. This puts Uganda in the low human development category: positioning the country at 161 out of 187 countries and territories. The rank is shared with Haiti: the poorest country in the Western Hemisphere and one of the poorest countries in the developing world with per capita income of $250 (see World Bank, 2014). This HDI for Uganda is below the average of 0.466 for countries in the low human development group and even below the average of 0.475 for countries in Sub-Saharan Africa. (UNDP, 2013).

The country is even worse-off in terms of Inequality-adjusted HDI (IHDI**),** which takes into account inequality in all three dimensions of the HDI. When the HDI value of 0.456 is discounted for inequality, the HDI falls to 0.303, showing a loss of 33.6 percent due to inequality in the distribution of the dimension indices. The best country in the world according to the HDR (2013) is Norway with a HDI of 0.955, and IHDI of 0.955. (UNDP, 2013).

Although literatures indicate that agricultural productivity growth is effective in reducing poverty and enhancing economic development, the effects are so varied and unclear on economic development across many developing countries including Uganda. This study seeks to assess the impact of agricultural productivity on economic development in Uganda.

1.3 Statement of the Problem

Despite the relatively high GDP growth achieved in Uganda in the last two decades, agriculture and its productivity have not grown consistently. The agricultural sector which employs over 70% of the total workforce grew at a rate of only about 1% per annum in the same period, and contributed less than 15% of the total GDP (UBOS, 2013). Agricultural productivity growth also stagnated since 1980 despite the rise in the national population. (IFPRI, 2008).

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). Uganda's growth 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 agriculture can play to anchor holistic economic development seems to be unresolved and attracting little attention.

It is upon the above problem that this study seeks to elicit the impact of agricultural productivity on economic development as a way to engender knowledge that can make Uganda's growth and development 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 agricultural productivity in Uganda, it will ascertain if agricultural productivity is a major determinant of inclusive growth in Uganda, and it will analyze the impact of agricultural productivity on major indicators of economic development of the country.

1.4 Study Objectives

The general **objective of the study** is to assess the impact of agricultural productivity on economic development in Uganda.

The specific objectives of the study are:

(i) To determine the major factors that affect agricultural productivity in Uganda.

(ii) To determine if agricultural productivity (crops and livestock) constitutes a binding determinant to Uganda's inclusive growth.

(iii) To analyze the impact of agricultural productivity on GDP, GNI per capita, HDI, IHDI and Gini Index for Uganda.

(iv) To develop a model/framework that attempts to explain how augmentation of agriculture in Uganda can enable the achievement of broad base economic growth and development.

1.5 Research Questions

The research questions that shall guide this study are:

(i) What are the key factors that determine agricultural productivity in Uganda?

(ii) Is agricultural productivity one of the binding determinants of inclusive growth in Uganda?

(iii) How does increase in agricultural productivity affect GDP, GNI per capita, HDI, IHDI and Gini Index for Uganda?

(iv) How can Uganda achieve rapid broad base economic development by improving agricultural productivity?

1.6 Hypotheses of the study

(a) The effects of potential factors that determine agricultural productivity will be analyzed vis-à-vis agricultural productivity for Uganda. Multiple regression analysis of the equation below will be applied using primary data that shall be collected from the field. It is thus hypothesized that the slope coefficients are simultaneously equal to zero.

$$A_i = \alpha_1 + \alpha_2 X_{2i} + \alpha_3 X_{3i} + ... + \alpha_k X_k + u_i \qquad \text{..... (1.1)}$$

Where A_i is agricultural productivity (for crops and livestock), α_1 is the common mean intercept for all the regressors, $\alpha_2, \alpha_3, ..., \alpha_k$ are slope coefficients, $X_2, X_3, ..., X_k$ are identified potential determinants to agricultural productivity, and u_i is the error term.

Null hypothesis (H_o): the identified factors do not affect productivity of agricultural i.e all slope coefficients are simultaneously equal to zero. (**H_o:** $\alpha_2 = \alpha_3 = ... = \alpha_k = 0$**)**

Alternative hypothesis (H_1): the identified factors do affect productivity i.e not all slope coefficients are simultaneously equal to zero. **(H_1:** $\alpha_2 \neq \alpha_3 \neq ... \neq \alpha_k \neq 0$**)**

(b) To measure the specific effects of the identified determinants (including agricultural productivity) on Uganda's inclusive growth (income and equity growth), multiple regression of the following form will be run using time series data:

$$G_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_k + u_i \qquad \text{..... (1.2)}$$

Where G_i is inclusive growth index (average income and equity index), β_1 is the common mean intercept for all the regressors, β_2, is slope coefficient of agricultural productivity, $\beta_3, ..., \beta_k$ are slope coefficients of other identified determinants of inclusive growth, X_2 is agricultural

productivity , $X_{3,}$ ....,X_k are other identified potential constraints to inclusive growth, and u_i is the error term. It is hypothesized that:

Null hypothesis (H_o): Agricultural productivity does not constitute a binding determinant of Uganda's inclusive growth. (**H_o:** $\beta_2 = 0$**)**

Alternative hypothesis (H_1): Agricultural productivity is a binding determinant of Uganda's inclusive growth. **(H_1:** $\beta_2 \neq 0$**)**

The alternative hypothesis stated is non-directional; a two tail test will be applied at 5% confidence level to test the significance of the hypothesis.

(c) To analyze the effect of agricultural productivity on the major indicators of economic development (GDP, GNI per capita, HDI, IHDI and Gini Index), this study will apply panel data regression method using random effects approach (see details under methodology). The following equation will be used to run the panel regression:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \omega_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1.3)$$

Where **i =1,2,3** and **t=1,2,3.....60,** and $\mathbf{e_i}$ is the random error term having a mean value of zero and a variance of σ^2. $\mathbf{Y_i}$ will be a selected development indicator: GDP, GNI per capita, HDI, IHDI or Gini Index for Uganda. $\mathbf{X_2}$ is agricultural productivity, β_1 is the common mean intercept value for the three countries (Uganda, Ghana and Brazil), β_2 is slope coefficient, and ω_{it} is the error term. It is hypothesized as follows:

Null hypothesis (H_o): Differences in agricultural productivity do not significantly explain variations in the development indicators (GDP, GNI per capita, HDI, IHDI and Gini Index) (**H_o: $\beta_2 = 0$)**

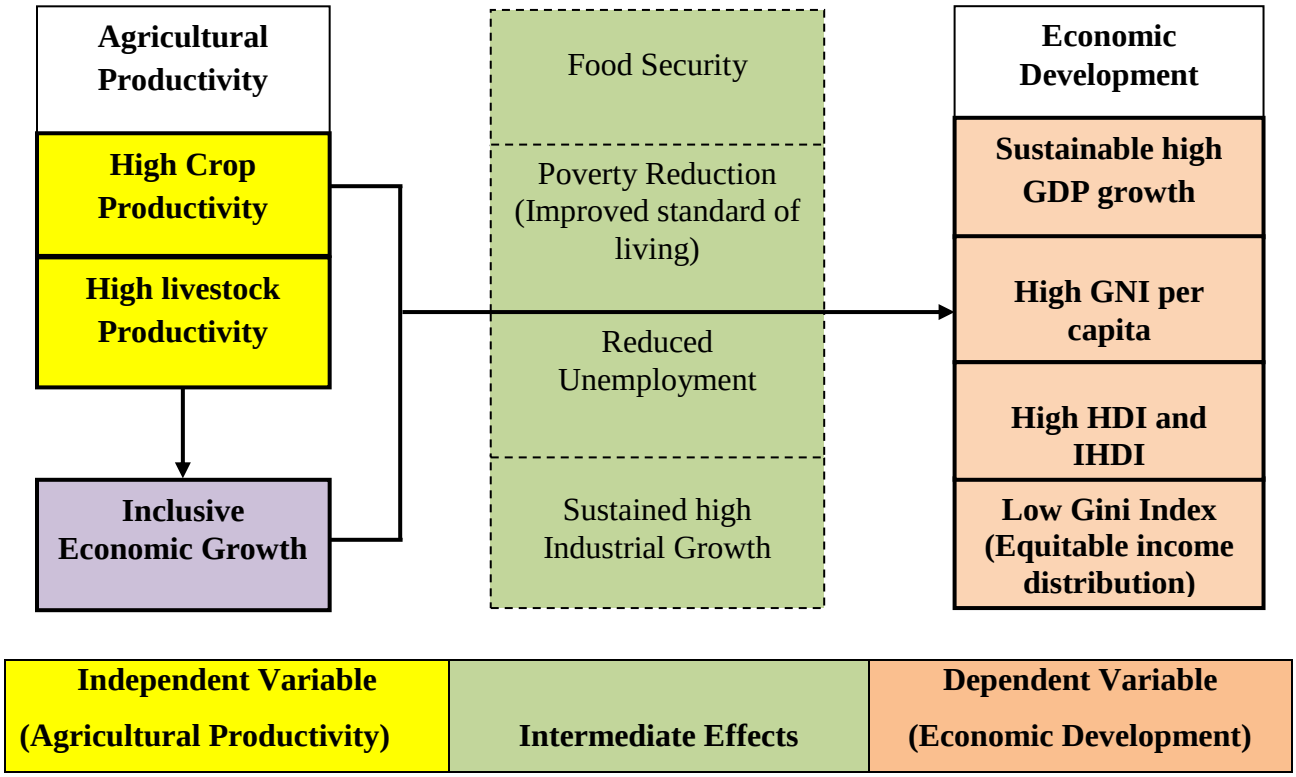
Alternative hypothesis (H_1): Differences in agricultural productivity do explain the variations in the indicators. (**H_1: $\beta_2 \neq 0$)**

This non-directional alternative hypothesis will be tested using a two tail test at 5% confidence level to test the significance of the hypothesis. The regression coefficient (β_2), the Chi square value (χ^2), the correlation coefficient (Γ), and the coefficient of determination ($\Re^2$) shall all be tested for statistical significance. When using time series data, the researcher will check for stationarity, normality of the distribution, and serial correlation before undertaking correlation analysis

1.7 Conceptual Framework

The framework below presents the links between agricultural productivity, (both crops and livestock) and the indicators of economic development. Improvements in the indictors depict partial achievement of economic development. The diagram is based on **Fei–Ranis model of economic growth** (see literature review for details). The framework is the researcher's own position on the problem and it gives direction to the study; it will guide the researcher in this study between agricultural productivity and economic development in order to achieve the set objectives.

Figure 1: Conceptual framework



Source: Adapted from Fei–Ranis Model of economic growth, (1964)

1.8 Significance of the Study

As noted by Kraay (2004) and Berg (2011), for growth to be sustainable and effective in reducing poverty, it needs to be inclusive. However, policy reforms in most LDCs have concentrated on industrial and service sectors leaving majority of the rural poor especially those in the agriculture bypassed by development, as evidenced by poverty persistence and food shortage (Ianchovichina & Lundstrom, 2009). The inclusive growth framework explains that the problem of poverty can best be tackled through a sustained higher GDP growth, expansion of employment, and generation of supplementary income through subsidiary occupations. By

applying the methodology, this study hopes to provide findings that the government may base on while considering alternative development policies that are more holistic for the country.

To the best of my knowledge this new framework has never been applied for a study in Uganda. By applying it, this study hopes to elicit and clarify many issues about Uganda's growth, poverty and unemployment problems and suggest possible remedial measures. It is an intention of this study to engender knowledge on how to raise the pace of growth of an economy while also enlarging its size by including people who were formerly bypassed by growth and development, particularly those in agriculture, as the process will foster sustainable economic growth that benefits all sectors of the economy.

It is also an objective of this study to come up with a new model/framework that shall attempt to explain how augmentation of agriculture in Uganda can enable the achievement of sustainable food security, employment-led growth, poverty reduction, rural transformation and overall economic development. The study therefore hopes to create a cluster of knowledge that will serve as pedestal for other researches.

1.9 Justifications of the study

The World Bank, IMF, WTO, WHO and OECD are all advocating for inclusive growth in developing countries. The institutions are calling upon policy makers to design appropriate policies to strengthen growth and make it inclusive and sustainable over time, based on the perception that strong growth is clearly compatible with social cohesion (See World Bank, 2014). This study is therefore timely for engendering knowledge on such policies for Uganda.

Globally agriculture is the main source of livelihood for about 2.5 billion people, including 1.3 billion smallholder farmers and landless workers. Public investments and government spending on agriculture in developing countries have gradually declined since the 1980s (see World Bank, 2014). In Uganda the agricultural sector employs about 19.3 million people out of the national population of 37 million people, yet growth of its productivity has stalled (see UBOS, 2011). Given the relevance of the agricultural sector in Uganda, more researches should be directed on increasing agricultural productivity. It is objective of this study to assess the factors that affect agricultural productivity and to determine the most effective means of raising it in Uganda.

Most literatures indicate that investment in agriculture and raising its productivity stimulates economic growth and development (see World Bank, 2008); however in Uganda that relationship has not been clarified. Uganda's GDP/economic growth has been averagely high for nearly two decades, but poverty, hunger and unemployment have remained high especially in the rural areas. A comprehensive research of this nature that seeks to understand these problems and source for ways of improving them is imperative for the country.

1.10 Scope of the Study

In analyzing agricultural productivity with economic development, while applying the Inclusive Growth (IG) framework to source for ways of eradicating poverty, this study will be applied to the entire economy using national data.

This study will concentrate mainly on the agricultural sector since it is the major sector housing majority of Uganda's poor: this follows the fact that pro-poor, broad based, decentralized growth is the heart of the Inclusive Growth framework. The study will use relevant panel and time series

data that have been collected /compiled within the last twenty (20) years (see data sources on page 44) to analyze how improvement in agricultural productivity impacts on economic development in a holistic way.

This study is expected to be fully completed within three (3) years of the researcher's Doctoral study program running from November 2013 to November 2016.

1.11 Operational Definitions

Agricultural productivity: The output produced by a given level of input(s) in the agricultural sector of a given economy. It is the ratio of the value of total farm outputs to the value of total inputs used in farm production.

Economic Development: A multidimensional process that involves major changes in social structures, popular attitudes, and national institutions as well the acceleration of economic growth, the reduction of inequality and unemployment, and the eradication of poverty.

Food security: When all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.

Human Development Index (HDI): Is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living.

Inclusive growth: Economic growth process which advances equitable opportunities for economic participants with its benefits realized by every section of a society. It focuses on creating productive employment as a means of increasing the incomes of the poor and formerly excluded groups, so as to raise their standards of living. It involves growth in both income and equity or income distribution.

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

Rural Development: Actions and initiatives in rural communities that are undertaken to improve the standard of living in those non-urban environments, such as infrastructure improvement and enhancement of existing industries.

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. The unemployment rate is calculated as a percentage by dividing the number of unemployed individuals by all individuals currently in the labor force.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter provides a brief survey of literature as background for evaluating the methodology and research questions. Few relevant academic literatures on agriculture, agricultural productivity, growth and development, and Inclusive Growth (IG) framework, are provided and discussed. The literature review is organized under four main themes based on the research objectives: i) Theories and perspectives of economic development. ii) Measures of Economic development and capabilities. iii) Agriculture, agricultural productivity and the economic development. iv) The Inclusive Growth Framework.

2.2 Theories and perspectives of economic development

2.2.1 Development theories

The earliest Western theory of development economics was mercantilism, which was adopted by major European nations in the 17th and 18th century. The theory relied upon strong state regulation of economic activities. Mercantilism believed that a nation's prosperity depended on its supply of capital, represented by bullion (gold, silver, and trade value) held by the state. It emphasized maintenance of a high positive trade balance (maximizing exports and minimizing imports) as a means of accumulating bullion. To achieve a positive trade balance, protectionist measures such as tariffs and subsidies to home industries were advocated. (David W.P, 1992).

The Mercantilist doctrine came under attack following the work of Adam Smith in his book The Wealth of Nations. In the book, Adam Smith argued that productive capacity rests on the division of labour and the accumulation of capital. Huge efficiencies can be gained by breaking

production down into small tasks, each undertaken by specialist hands. This leaves producers with a surplus that they can exchange with others, or invest in new and even more efficient labour-saving machinery.

Adam Smith's argument that regulations of commerce are ill-founded and counter-productive and that an economic system was automatic, deviated from the mercantilist. According to Smith (1776), where things are scarce, people pay more for them: there is more profit in supplying them, so producers invest more capital to produce them. Where there is a surplus, prices and profits are low, producers switch their capital and enterprise elsewhere. Industries thus remain focused on the nation's most important needs, without the need for central direction.

Following mercantilism was the related theory of economic nationalism of the 19th century related to the development and industrialization of the United States and Germany, and the Post-World War II theories of modern development economics that traced to the need for, and likely problems with the industrialization of East Europe after WW II. It was **o**nly after WW II that economists turned their concerns towards Asia, Africa and Latin America.

A major contributor thus was Prof Simon Kuznets Nobel prize winner in 1971 in economics for his pioneering work in the measurement and analysis of economic growth. Kuznets gave six characteristics of modern economic growth which are manifested in the growth process of most developed nations. They are high rates of growth of per capita and population, high rates of increase in TFP, high rates of structural transformation, high rates of social and ideological transformation, international economic outreach, and limited spread of economic growth. (Todaro and Smith, 2011).

Other theories that followed were the linear-stages-of-growth model that was first formulated in the 1950s by W. W. Rostow, the Structural-change theory, the International dependence theory of the 1970s and the neoclassical theories.

Structural-change theory deals with policies focused on changing the economic structures of developing countries from being composed primarily of subsistence agriculture to a "modern, urbanized, and industrially diverse manufacturing and service economy." There are two major forms of structural-change theory; W. Lewis' two-sector surplus model, which views agrarian societies as consisting of large amounts of surplus labor which can be utilized to spur the development of an urbanized industrial sector (Lewis, 1954), and Hollis Chenery's development patterns, which holds that different countries become wealthy via different trajectories. According to Chenery (1968), the pattern that a particular country will follow depends on its size, resources, current income level and comparative advantages relative to other nations. Lewis' two-sector surplus model was later modified by John C.H Fei and Gustav Ranis.

This study adopts the **Fei–Ranis model of economic growth**, while considering its limitations. Developed by John C.H Fei and Gustav Ranis, the **Fei–Ranis model of economic growth** is a dualism model in development or welfare economics. The model is an extension of the Lewis two sector model, and it is sometimes known as the Surplus Labor model (see Todaro & Smith, 2011). It recognizes the presence of a dual economy comprising both the modern and primitive sectors and takes into account the economic situation of unemployment and underemployment of resources, unlike many other growth models that consider underdeveloped countries to be homogenous in nature.

According to this theory, an economy consists of an existing underdeveloped agricultural sector and a modern sector that is rapidly emerging with a small industrial sector. With both sectors co-existing in the economy, therein lies the crux of the development problem. According to Fei and Ranis (1964), development can be brought about only by a complete shift in the focal point of progress from the agricultural to the industrial economy, such that there is augmentation of industrial output, by transfer of labor from the agricultural sector to the industrial sector: implying that underdeveloped countries do not suffer from constraints of labor supply.

At the same time, the model emphasizes that growth in the agricultural sector must not be negligible but augmented, and its output should be sufficient to support the whole economy with food and raw materials. Similar to the Harrod - Domar model, saving and investment are the driving forces when it comes to economic development of underdeveloped countries.

A contemporary problem that limits the Fei–Ranis Model of Economic Growth and Development is that it emphasizes urban development at the expense of rural development which can lead to a substantial rise in inequality between regions of a country. This limitation certainly forms a basis for the evolution of the inclusive growth model, and it justifies the need for a research on agricultural productivity, and economic development.

2.2.2 Economic development perspectives

Traditionally economic development meant achieving sustainable rates of growth of income per capita to enable a nation expand its output at a rate faster than the rate of its population growth. 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 development. (Todaro and Smith, 2011)

In the 1970s economic development got redefined in terms of reduction or elimination of poverty, inequality and unemployment within the context of a growing economy. According to Todaro and Smith (2011), economic development refers to a multidimensional process that involves major changes in social structures, 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 however, argued that the "capabilities to function" is what really matters for status as a poor or non poor person. As Sen put it "Economic growth cannot be sensibly treated as an end in itself. Development has to be more concerned with enhancing the lives we lead and the freedom we enjoy". He defined development as the process of expanding the real freedoms that people enjoy. (Sen, 1999)

Development should therefore be conceptualized as the sustained elevation of an entire society and social system toward a better or more humane life. Todaro and Smith (2004) identified three basic components (core values) for understanding development, 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. Self esteem means the feeling of worthiness that a society enjoys when its social, political, and economic systems and institutions promote human values such as respect, dignity, integrity, and self determination. Freedom means a situation in which a society has at its disposal a variety of

alternatives from which to satisfy its wants and individuals enjoy real choices according to their preferences. (Todaro and Smith, 2011)

Development is therefore both a physical reality and state of the mind which society has, through some combination of social, economic and institutional processes, and a secure means for obtaining better life. According to Todaro and Smith (2011), regardless of the components of better life, development 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, in 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 development are realistic and are in line with the Millennium Development Goals and Targets for 2015, and the objectives of this study.

2.3 Holistic measures of economic development and capabilities

This study will concentrate on development indicators compiled from officially-recognized international sources such as World Bank, United Nations Development Program (UNDP), or International Monetary fund (IMF). The selected indicators are discussed below:-

2.3.1 The Human Development Index (HDI): The most widely used measure of comparative status of socioeconomic development is provided by the UNDP in its annual series of Human Development Reports (HDR). The HDI attempts to rank all counties on a scale of 0 (lowest human development) to 1(highest human development) based on three goals or end products of development: longevity as measured by life expectancy at birth, knowledge as measured by a weighted average of literacy and gross school enrolment ratio, and standard of living as measured by real per capita gross domestic product adjusted for differing purchasing power parity of each country's currency to reflect cost of living and for the assumption of diminishing marginal utility of income. (Todaro and Smith, 2011)

Since its inception in 1990, calculation of the traditional HDI underwent a number of changes. The latest calculation treats HDI as the geometric mean of the three dimension indices (life expectancy index, education index and GNI index) (see Human Development Report 2013), using the following formulae:

$$HDI = I_{life}^{1/3} . I_{Education}^{1/3} . I_{Income}^{1/3} \quad \text{.....(2.1)}$$

According to UNDP (2013), equity is an essential component of human development. It is neither desirable nor sustainable if increases in the HDI are accompanied by rising inequalities in income, unsustainable patterns of consumption, high military spending and low social cohesion. Every person has the right to live a fulfilling life according to his or her own values and aspirations without any form of discrimination or segregation. Inequality reduces the pace of human development and in some cases may even prevent it entirely.

The HDR (2013) has identified three drivers of development that have made many economies to realize progress in development and in the HDI. These drivers are: a proactive developmental

state, tapping of global markets, and determined social policy and innovation. The drivers are not derived from abstract conceptions of how development should work; rather, they are demonstrated by the transformational development experiences of many countries that have made rapid advances- Brazil, China, India, Indonesia, Mexico, South Africa and Turkey.The report further consents that growth has been more effective in reducing poverty in countries with low income inequality than in countries with high income inequality.(UNDP, 2013)

2.3.2 The Inequality-adjusted Human Development Index (IHDI): The IHDI accounts for inequalities in HDI dimensions by "discounting" each dimension's average value according to its level of inequality, it is equal to HDI when there is no inequality across people but falls further below the HDI as inequality rises. The IHDI is based on a distribution-sensitive class of composite indices proposed by Foster, Lopez-Calva and Szekely (2005). The IHDI therefore shows actual level of human development (taking into account inequality), while the HDI can be viewed as an index of the "potential" human development that could be achieved if there was no inequality. (UNDP, 2013)

2.3.3 GNI per capita: Formerly known as GNP per capita, GNI per capita is the gross national income, converted to U.S. dollars (using the World Bank atlas method) divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in a country's local currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies. (World Bank, 2014).

2.3.4 Gini-Coefficient (Gini Index): This measures the extent to which distribution of income or consumption expenditure among individuals /households within an economy deviates from a perfectly equal distribution (Pearce,W. D, 1992). Mathematically, based on the Lorenz curve, it is the ratio of the area between the line of perfect equality and the Lorenz curve divided by the total area of the triangle under the line of equality. It ranges between zero and one.

This study will analyse the impact of agricultural productivity on the above development indicators of Uganda. However, more emphasis will be put to analyze the impact of agricultural productivity on the IHDI (since it incorporates both aspects of HDI and per capita income) and the Gini index.

2.4 Agriculture, agricultural productivity and economic development

A valid generalization about the poor is that they are disproportionately located in the rural areas, are primarily engaged in agriculture, and more are women and children than adult males. About two thirds of the very poor depend on subsistence agriculture 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 agricultural labor productivity is on average 3 times more effective in raising incomes of the poorest quintile in developing countries than an equivalent increase in GDP coming from non-agricultural labor productivity. Similarly, there are larger effects from agricultural growth on poverty reduction in Sub-Saharan Africa and South Asia, but larger poverty-reducing effects of growth originating in other sectors in East Asia and Latin America. (Ligon and Sadoulet, 2007)

2.4.1 Agriculture and economic development

Agriculture can work in concert with other sectors to produce faster growth, reduce poverty, and sustain the environment. According to the World Bank (2008), agriculture 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 development. (World Bank, 2008).

(i) **As an economic activity:** Agriculture can be a source of growth for the national economy, a provider of investment opportunities for the private sector, and a prime driver of agriculture-related industries. The industries and services linked to agriculture in value chains often account for more than 30 percent of GDP in transforming and urbanized countries. Agricultural production is important for food security because it is a source of income for the majority of the rural poor. (World Bank, 2008)

(ii) **As a livelihood:** Agriculture is a source of livelihoods for an estimated 86 percent of rural people. Of the developing world's 5.5 billion people, 3 billion live in rural areas, nearly half of humanity. Of these rural inhabitants an estimated 2.5 billion are involved in agriculture, and 1.5 billion are smallholder farmers. More than 80 percent of the decline in rural poverty is attributable to better conditions in rural areas rather than to out-migration of the poor. Large decline in the number of rural poor has been confined to East Asia and the Pacific, while in South Asia and Sub-Saharan Africa, rural poverty has continued to rise and will exceed the number of urban poor possibly until 2040. In these regions, a high priority is to mobilize agriculture for poverty reduction. (Ravallion, Chen, and Sangraula, 2007)

(iii) **As a provider of environmental services:** In using natural resources, agriculture can create good environmental outcomes. It is the largest user of water, and if misused it can create water

scarcity. It is a major player in underground water depletion, agrochemical pollution, soil exhaustion and global climate change, accounting for up to 30 percent of greenhouse gas emissions. But it is also a major provider of environmental services, sequestering carbon, managing watersheds, and preserving biodiversity. Managing the connections among agriculture, natural resource conservation, and the environment must be an integral part of using agriculture for development. (World Bank, 2008).

2.4.2 Agriculture and economic development policies

According to Kostas and Alberto (2003), 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 the promotion of rural development should be a key component of such strategies. Rural development requires four sets of measures. These are measures to:

(i) Provide an enabling policy environment for agricultural growth, rural development, and food security.

(ii) Sustainably strengthen agricultural productivity and competitiveness.

(v) Strengthen linkages between agriculture and the rural non-farm sector coupled with measures to facilitate participation by the poor in rural non-farm activities

(vi) Improve access by the poor to various assets as well as to decision making processes that influence their lives.

Based on the above literature, for growth to be effective in reducing poverty and income inequality, the poor must contribute to deliver growth and they must also benefit from growth. Agriculture which often employs majority of the rural poor must be a prime target in any policy design for sustainable growth and development in any poor agriculture based country.

However, Todaro and Smith (2011) noted that most governments in developing countries have neglected the agriculture sector leading to its poor performance. The governments have favoured investments in urban industrial economy due to the misplaced emphasis on rapid industrialization via import substitution and exchange rate overvaluation. These together with limited arable land, high population increase, and poor farming methods have made developing countries especially in Sahara Africa to have low agricultural productivity (World Bank, 2008).

Governments in developing countries therefore need to focus more on sectors that employ the poor, and promote utilization of factors of production that the poor possess. They should uphold scope for equitable distribution of resources, basic social services including better social security, while involving women. Accordingly, focusing on agriculture and increasing its productivity will enhance overall productivity in developing countries including Uganda.

2.4.3 Agricultural Productivity

2.4.3.1 Meaning and measuring of agricultural productivity

Agricultural Productivity has been defined by several scholars depending on their disciplines. In economics, agricultural productivity refers to the output produced by a given level of input(s) in the agricultural sector of an economy (see Fulginiti and Perrin, 1998). It may also be defined as "the ratio of the value of total farm outputs to the value of total inputs used in farm production" (Olayide and Heady, 1982).

Productivity of agricultural is measured as the ratio of final output, in appropriate units, to some measure of inputs. Singh and Dhillion (2000) suggested that the "*yield per unit*" should be considered to indicate agricultural productivity. Many scholars have criticized this suggestion pointing out that it considered only land as a factor of production, disregarding other factors.

Many other scholars believe that agricultural productivity should contain all the factors of production such as labor, farming experiences, fertilizers, availability and management of water and other biological factors (Dharmasiri, 2009).

Measures of productivity may be categorized as partial or total measures depending on the number of inputs under consideration. The partial measures of productivity can be misleading as they equally ignore the role of other inputs in any observed output changes (Zepeda 2001). Due to this shortcoming, a total measure of productivity was developed. Total factor productivity (TFP) is defined as the ratio of a measure of total output quantity to a measure of the quantity of total input (Zepeda 2001).

Total output as a ratio of some measure of labor quantity, usually man days in developing countries, is called labor productivity (LP): it provides an idea of output per worker. Output per area of land planted is land productivity (Zepeda 2001). These two mentioned measures are examples of single factor productivity (SFP), defined as the ratio of a measure of output quantity to the quantity of a single input used.

Productivity of land is a very important factor of agriculture because it is the most permanent and fixed factor among the three categories of input; land, labor and capital. Land productivity may be raised by applying input packages consisting of improved seeds, fertilizers, agro-chemicals and labour intensive methods, or by applying crop diversification/ multi cropping in a season on the same land. (Dharmasiri, 2008)

According to Dharmasiri (2009), productivity of labour is important as a determinant of the income of the population engaged in agriculture. In general, it may be expressed by the man

hours or days of work needed to produce a unit of production. The labour productivity has two major important aspects: i) It profoundly affects national prosperity. ii) It principally determines the standard of living of the famers. Agricultural labor productivity may be enhanced through training, and increase of incentives or wages etc

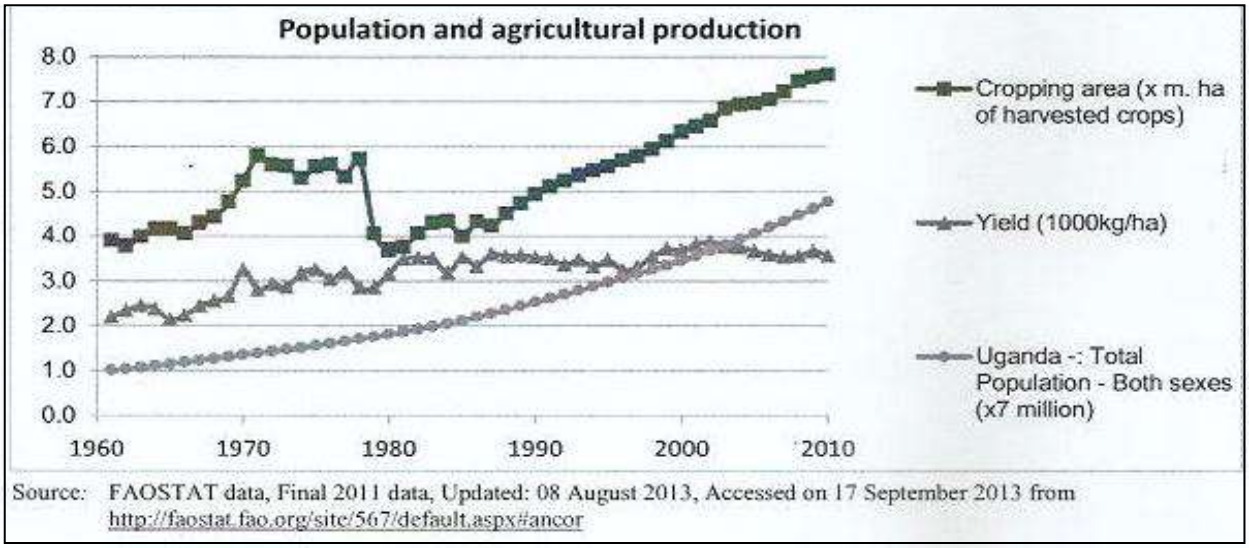
Capital, in terms of purchase of land, development of land, reclamation of land, drainage, irrigation purpose, livestock, feeds, seeds, agricultural implements, and machineries, crop production chemicals should also be given priority as a factor for enhancing agricultural productivity. (Dharmasiri, 2009)

2.4.3.2 Agricultural productivity trends in Uganda

Raising agricultural productivity has for long been Uganda's development agenda, but progress has been painfully low. The modest increases in agricultural productivity since 1990 have mostly been realized from the expansion of cultivated land rather than improvement in productivity per unit area of land (World Bank, 2001). Further expansion of cultivated land will be unsustainable in Uganda since access to land is increasingly constrained by high population growth (IFPRI, 2008)

According to FAO data, in the 1960s agricultural production thrived due to both area expansion and yield improvements: food production in Uganda increased more than population. In the 1970s this process halted, and around 1980 the agricultural area decreased. Overall, yield levels stagnated since the 1980s (see Figure 2 below). Looking at the trend since 1961, food production did not keep up with population growth in Uganda for the whole period.

Figure 2: Uganda 1961-2011: population, growth in cropping area and crop yield increases



Although limited technology, pests and diseases limit agricultural productivity in Uganda (see Nabbumba & Bihiigwa, 2003), the major reason for the poor performance of Uganda's agriculture has been the neglect of this sector in development priories by the government. Other factors that constraint increasing agricultural production include: poor agricultural pricing policies, low fertilizer use, low access to agricultural credit, land tenure insecurity, land degradation, poverty and gender issues, low and unstable investment in agricultural research, and poor market access. (IFPRI, 2008)

Based on available literature, there is clearly some consensus about stagnation of agriculture productivity in Uganda despite the steady increase in population. However, very little literatures seem to show how agricultural productivity in Uganda should be enhanced. Given that expansion of cultivated land will not be sustainable, it is very important to source for ways of increasing productivity per unit area of land if the agricultural sector is to properly feed the country's population, provide effective employment and support economic development.

2.5.1 The Inclusive Growth Framework

According to Berg and Melamed (2012), inclusive and sustainable economic growth is crucial for long-term poverty reduction. They consider inclusive growth (IG), to be characterised by people's ability to participate in, benefit from, and create wealth and job from growth.

Mujumdar (2007), believes that inclusive growth encompasses both growth and development. It has growth component because a high GDP growth rate like 8% targeted cannot easily be sustained unless other sectors or segments of the economy which have been sluggish for several reasons including policy neglect can be activated. It is partially development because this is perhaps the best route by which the bulk of the poor who are essentially rural based can be provided with decent livelihood and food security. 'The inclusiveness' has two dimensions: 1) In terms of sectors/segments of the economy that need to be brought into fold of a vibrant economy. 2) In terms enabling sections of the population whom the growth process has bypassed to be fully engaged in the development process.

Ianchovichina and Lundstrom (2009) define inclusive growth as growth that holistically enlarges the size of the economy by providing a level playing field for investment while increasing productive employment opportunities for all. In order for growth to be sustainable and effective in reducing poverty, it needs to be inclusive (Berg and others 2011a; Kraay, 2004).

Ianchovichina and Lundstrom (2009) further say that the IG approach takes a long term perspective as it focuses on sustained growth, noting that:

(a) For growth to be sustained in the long run, it should be **broad-based** across sectors. Issues of structural transformation for economic diversification therefore take a center stage.

(b) It should also be **inclusive** of the large part of the country's labor force, where inclusiveness refers to equality of opportunity in terms of access to markets, resources and unbiased regulatory environment for businesses and individuals.

All these perceptions of inclusive growth concur with the definition of pro-poor growth provided by Ravallion and Chen. Ravallion and Chen (2003), explain that growth is pro-poor if poor people benefit in absolute terms, as reflected in some agreed measures of poverty.

The inclusive growth analytics framework stems from the Hausmann Rodrik Velasco (HRV) framework and Heuristic approach. According to HRV, targeting the most binding constraints to a country's growth has vital advantages over other approaches to policy selection. The HRV (2005) developed a decision tree framework (see appendix III) for identifying a country's most binding constraints on economic growth.

Advocates of Inclusive Growth framework view it as a further refinement to the HRV; they note the limitations of the HRV as: 1) It is difficult to reject constraints as not binding. 2) It is very critical to acknowledge information gaps to avoid drawing wrong conclusions. 3) The analysis is demonstrated at aggregate level offering little insight about the distributional impacts of growth. 4) The HRV focuses on the short-run, rather than long-run growth determinants. 5) In the HRV model, human capital is viewed as a complementary factor, although skills are a key determinant of exclusion from labor market. (Ianchovichina & Lundstrom, 2009).

Ianchovichina and Lundstrom, (2009), explained three main steps involved in an inclusive growth analytics as follows:

(i) Background analysis: this involves an understanding of major factors explaining the country's past growth and poverty reduction trends, overall productivity and employment dynamics in the country, major challenges and opportunities faced, and possibilities for economic transformation and diversification.

(ii) Analyzing and compiling the profile of economic actors, while paying attention to particular excluded groups. This includes a description of income earning activities of self- or wage-employed, distinguished by sector, size of firm, by geographical areas (e.g. rural, urban), by type (e.g. formal or informal) etc. Results of the first two stages should indicate the activities specific groups are engaged in and to what extent these activities can anchor growth or if there is need for migration to other sectors in the short or the long run.

(iii) Thirdly, finding the binding constraints to inclusive growth, that involves the use of organizational framework (discussed below). The IG relies extensively on cross country comparisons to benchmark performance against other countries. Benchmarking the performance of an economy helps to identify factors that hold private investment and growth.

In this study the researcher will run the analysis of Uganda's economic growth and development alongside agricultural productivity and the results will be compared with those of Ghana and Brazil as a way of benchmarking performance.

2.4.2 Determining the binding constraints to Inclusive Growth using the organizational framework

The economic agent in the inclusive growth diagnostics framework is the individual rather than the firm or investor (as done in the HRV framework, see appendix III) since it is assumed that the main instrument for a sustainable and inclusive growth is productive employment.

The ability of the poor to be productively employed depends on two factors:

(a) Their employability, which in turn depends on their individual resources. An employability analysis includes analysis of (i) the existing stock of human capital, such as education and health; (ii) the ability of the poor to acquire skills and stay healthy; and (iii) access to labor markets where individuals can earn income by offering their skills.

(b) The opportunities for the poor to make full use of these resources as the economy develops.

The analysis therefore looks at ways to strengthen the productive resources and capacity of the poor on the labor supply side as well as ways to open up new opportunities for productive employment on the labor demand side.

If the main problem is lack of employment for the poor due to limited supply of certain types of labor skills, the constraints are related to the productive resources and capacity of the poor as individuals rather than the environment in which they can use these resources. This situation calls for an employability analysis that will shed light on the resources of the poor, e.g. the poor's labor skills and the productivity attributes that they bring to a job. If the main problem is low labor productivity or lack of employment opportunities for the poor due to limited labor demand, an analysis of the bottlenecks in the business environment is necessary.

This study will adopt the inclusive growth diagnostics framework and apply it as done in the HRV. The inclusive growth principles are new but gaining a lot of globally attention. World Bank, IMF, WTO, WHO and OECD are all advocating for inclusive growth in developing countries. However, very few literature and models still exists on it. The major challenge hitherto to this new concept of growth and development is its measuring overtime.

2.5.3 Measuring inclusive growth

The World Bank, IMF, WTO, WHO, and OECD all advocate for inclusive growth especially in developing countries. Literatures on inclusive growth unanimously conclude that for growth to be inclusive, equity must be a component of growth and at the same time growth must be pro poor. (Anand, Mishra and Peiris, 2013).

A problem to the trending inclusive growth debate is lack of an agreed measure. In an attempt to measure inclusive growth, Ali and Son (2007) developed/used an equity index of opportunity (EIO) based on the concept of concentration curve. To capture the magnitude of change in income distribution, they used a simple form of the social mobility function by calculating an index (social mobility index) from the area under the social mobility curve as below:

$$Y = \int_0^{100} y_i di \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.2)$$

Where Y is the equity index of opportunity (EIO), y_i is the average income of the bottom i percent of the population, i varies from 0 to 100 and y is the mean income.

The greater the Y, the greater is the income. If for a population income distribution is completely equitable then Y will be equal to y. If Y is lower than y, it implies that the distribution of income is inequitable. So, the deviation of Y from y is an indication of inequality in income distribution. A country's development objective should be to maximize Y. (Ali and Son, 2007)

Based on the opportunity index, Ali and Son (2007), proposed an Income Equity Index (IEI) as $\mathbf{\Phi = Y/y}$. For a completely equitable society $\Phi = 1$. Thus a higher value of Φ close to 1 represents higher income equality. Rearranging the equation above, we get:

$$\mathbf{Y = \Phi.y} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.3)$$

In a further effort to measure inclusive growth, Anand, Mishra and Peiris (2013) of the IMF, explain that inclusive growth requires increasing Y which could be achieved by: (i) increasing average income (*y*) through growth (ii) increasing the equity index of income **Φ**, through increasing equity; or (iii) a combination of (i) and (ii).

Differentiating the above equation:

$$dY = \mathbf{y}.d\mathbf{\Phi} + \mathbf{\Phi}.d\mathbf{y} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.4)$$

Where *d*Y is the change in the degree of inclusive growth. Growth is more inclusive if *d*Y>0. This method allows decomposition of inclusive growth into income growth and change in equity. The first term is the contribution of increase in average income (keeping income distribution constant) while the second term is the contribution of changes in the income distribution (keeping the average income unchanged).

Anand, Mishra and Peiris (2013) then used the equation below to measure inclusive growth:

$$\mathbf{dY}/_{\mathbf{Y}} = \mathbf{dy}/_{\mathbf{y}} + \mathbf{d\Phi}/_{\mathbf{\Phi}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\

and Gini Coefficient (Gini Index) to generate a unified measure of inclusive growth that integrates both growth and equity for Uganda as follows:

(i) Overtime as a country experiences economic growth, the Gross National Income grows and often the GNI per capita must improve (grow), unless the population is over-rising. Therefore, in the range of 0 to 1, the GNI index of a properly growing economy must be increasing.

(ii) Although Simon Kuznets suggested that in the early stages of economic growth the distribution of income tends to worsen; only at later stages will it improve (see Kuznets's inverted U hypothesis), averagely with development, in the range of 0 to 1, every country's Gini index must slowly decrease as an indication of improved equality in the distribution of income.

In this study, Gini index (ɠ) will be subtracted from the GNI per capita index (y̍) for each year to get the country's Inclusive Growth Index (G̍) for that year.

So that: $\mathbf{G̍ = (y̍ - ɠ)}$ ……. (2.6)

Where $-1 \leq \mathbf{G̍} \leq \mathbf{1}$

If average income is high ($y̍ \rightarrow 1$) and income is equitably distributed ($ɠ \rightarrow 0$), the value of G̍ will be close to 1. If average income is low ($y̍ \rightarrow 0$) and income is inequitably distributed ($ɠ \rightarrow 1$), the value of G̍ will be close to -1. Implying for an inclusively growing economy, the inclusive growth index will be close to 1. To estimate the Inclusive growth rate, the rate of change in the absolute value of G̍ will be calculated. The estimate will show whether a country is growing inclusively (i.e G̍ is increasing positively) or a country is not growing inclusively (G̍ is decreasing).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter presents the principles and procedures that shall be applied or followed in undertaking this research. It covers the research design, data collection methods, sampling technique, data sources, data quality control methods, and the ethical considerations of the study. Details of the three methods of analyses proposed are also provided, that is, multiple regression analysis, the Inclusive Growth Analytics Framework, and panel data regression analysis.

3.2 Research design

This research will be quantitative since it will involve an inquiry into the identified/stated problem, based on testing the earlier stated hypotheses. In this study measurements will be in numbers, and data analysis will involve statistical techniques with an intention to determine whether the predictive generalizations of the hypotheses hold or not. Specifically, the study will employ Causal Research Design as it will attempt to measure what impact change in agricultural productivity will have on the indicators of economic development for Uganda.

3.3 Data Collection methods

Data for this study will be collected using three methods:

(i) **Questionnaires**: Carefully constructed questions intended to solve the first and second specific objectives will be used for collecting primary data (see appendix I). Clear and simple questions shall be used to collect data that can enable the study to establish the major determinants of agricultural productivity in Uganda, and to ascertain if agricultural productivity is one of the binding determinants of inclusive growth in Uganda.

(ii) **Interviews:** This will be used to consolidate the questionnaires and to generate more detailed data for agricultural productivity and the binding constraints to inclusive growth. It will involve face to face interviews between the researcher and the identified interviewees (agricultural technical experts and selected farmers).

(iii) **Record or documentary review**. Carefully selected authentic and published documents shall be considered as sources of secondary data for this study. Time series and panel data that shall be collected using record review will be used to run panel data regression analysis or solve objective three and also answer research questions three and four.

3.4 Study Population

The population for this study will be all households engaged in agriculture (both crops and livestock production) in Uganda, estimated to be about 4 million. (see Statistical Abstract 2011, MAAIF, 2011).

3.5 Study Sample

This study will use a sample of 500 households engaged in agriculture. The reason for the small sample size (500 respondents/households) is that the researcher is well aware that the resources, both time and money that shall be available for this study will not be enough to reach all farmers (households) in the country.

3.6 Sampling Strategy/technique

Multi-stage sampling technique will be applied; it is preferred because it will enable the researcher to effectively employ random or cluster sampling from the population. It also fosters convenient break down of groups and subgroups (regions/districts/counties) into smaller levels

until the researcher reaches the desired type or size of the groups. To select the sample of 500 respondents of the farmers at random, the method will be applied as follows:

The research will consider all the five regions of the country (Central, North, East, West and South). The researcher will then select two districts at random from each region as a way of spreading the samples/respondents. He will then select two counties at random from each of the districts and finally select 25 households (farmers) at random within each of the 20 counties to make up the sample of 500 households. This method will allow data collection in 20 relatively small areas instead of having to visit the farmers in all the districts/towns in the country. Only experienced adult farmers shall be considered to fill the questionnaires.

3.7 Data types and sources

Both primary and secondary data shall be used for this study.

(a) Primary data for this study will be collected using questionnaires and interviews (see appendix I and appendix II).

(b) The secondary data for this study will mainly be time series and panel.

Secondary data on agricultural productivity, standard economic growth determinants, GNI per capita, HDI, IHDI and Gini-Coefficient that will be required for this study shall be got from the following sources:-

1) Ministry of Finance Planning and Economic Development (MFPED): (http://www.finance.go.ug/). Data on income, GDP growth, government expenditures, economic performance, shall be obtained from here.

2) Uganda Bureau of Statistics (UBOS): (http://www.ubos.org/). National statistics on poverty, population, education, health, trade, and employment shall be got from UBOS.

3) Bank of Uganda (BoU):(http://www.bou.or.ug/): Data on inflation, interest rates, exchange rates, macroeconomic policies, and financial market performance shall be got from BoU.

4. Ministry of Agriculture, Animal Industry and Fisheries: (http://www.agriculture.go.ug/). Data on agricultural productivity, land, agricultural policies shall be got from this ministry.

5) Food and Agricultural Organization of the United Nations (FAO) (http://faostat.fao.org/site/339/default.aspx). Statistics on agricultural productivity for Uganda, Ghana and Brazil will be obtained from FAO.

6) United Nations Development Program (UNDP) (http://www.undp.org/content/undp/en/home/librarypage/hdr/). Data on indicators such as HDI, IHDI, GII, and Multidimensional poverty Index (MPI) will be got from Human Development Reports of the UNDP

7) Other sources of data will be the World Bank, and International monitory Fund (IMF).

3.8 Data Quality Control

Only data from reliable sources shall be considered for the study. The researcher shall proof read the data so as to detect and correct errors. Where necessary, some editing and adjustments shall be done to avoid outliers or wild values. To ensure reliability of data, the researcher will test the data for reliability using Internal Consistency Technique according to Kunder-Richardson (K-R $_{20}$) formulae. (see Mugenda and Mugenda, 2003). The process will involve splitting the data into halves and computing the reliability coefficient using the formulae:

$$K - R_{20} = \frac{(K)(S^2 - \sum s^2)}{(S^2)(K-1)} \quad \ldots\ldots\ldots\

Where K-R_{20} is reliability coefficient of Internal Consistency, K is the number of items used to measure the intercept, S^2 is the variance of all the scores, and s^2 is the variance of individual scores. A high coefficient implies the items correlate highly among themselves i.e. there is consistency among the items/observations.

To ensure validity, the researcher will assess construct validity by comparing Uganda's data with data from Ghana and Brazil by correlating the measurements and computing validity coefficients. Factor analysis will be employed to validate the constructs and to cluster the indicators that correlate highly with each others.

3.9 Data analysis

Three methods of analysis are proposed for this research:

(a) **Multiple regression analysis:** The effects of potential factors that determine agricultural productivity will be analyzed using multiple regression. This will enable the researcher to ascertain the specific factors that have major effects on agricultural productivity in Uganda. The analysis will be based on primary data collected using questionnaires and interviews. Multiple regression analysis of the equation below will be applied.

$$A_i = \alpha_1 + \alpha_2 X_{2i} + \alpha_3 X_{3i} + ... + \alpha_k X_k + u_i \qquad \text{..... (1.1)}$$

Where A_i is agricultural productivity (for crop, poultry and livestock), α_1 is the common mean intercept for all the regressors, $\alpha_2, \alpha_3, ..., \alpha_k$ are slope coefficients, $X_2, X_3, ..., X_k$ are identified potential determinants to productivity, and u_i is the error term. This analysis will be done using SPSS.

(b) **The inclusive growth analytics framework**: this will be applied to determine the key binding determinants to inclusive growth, and to ascertain if agricultural productivity constitutes a binding determinant to inclusive growth in Uganda.

The study will identify potential growth determinants that may constitute binding constraints such as education levels, investment levels, government consumption, quality of maintenance of the rule of law, inflation, trade openness, and terms of trade (see Barro R. J, 1996), following steps in inclusive growth framework (discussed below). Others potential determinants include returns to capital accumulation, their private appropriability, and cost of financial accumulation (see HRV 2005). Agricultural productivity will also be included as a potential determinant and its effect on inclusive growth will be analyzed statistically.

To ascertain the binding constraints to inclusive growth, the study will undertake Business Environment Analysis (BEA) in a similar way as applied in the HRV (2005) tree (Appendix III).The BEA looks at the problems of the poor individuals' employment (example low labour productivity or lack of employment opportunities) from the demand side in order to find ways to open up new opportunities for productive employment. At every stage of the framework there are two or three alternative sets of factors that can be considered as binding or not, and the decision to chose the binding factor(s) will entirely depend on the analysis of the country's data. Each time a set of variables are diagnosed to be binding determinants/constraints, the framework will allow downward movement until when we ascertain the lowest possible problems or binding constraints before another route can be pursued.

To measure the specific effects of the determinants (independent variables) on inclusive growth (income and equity growth), multiple regression of the following form (equation 3.2 below) will be run using time series data for Uganda:

$$G_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_k + u_i \qquad \text{..... (3.2)}$$

Where G_i is inclusive growth index (i.e average income and equity index), β_1 is the common mean intercept for all the regressors, β_2, is slope coefficient of agricultural productivity, $\beta_3, ..., \beta_k$ are slope coefficients of other identified determinants of inclusive growth, X_2 is agricultural productivity , $X_3, ..., X_k$ are other identified determinants to inclusive growth, and u_i is the error term. The validity of each determinant will be explained according the regression results. The analysis will be done using SPSS.

(c) **Panel data regression analysis**: it will be applied to determine the impact of agricultural productivity on the key indicators of economic development based on random effects approach. Agricultural productivity statistics (independent variable) for Uganda will be computed and modeled against GDP, GNI per capita, HDI, IHDI and Gini Index. To foster benchmarking, the same procure will be repeated using data for two other countries (Ghana, Brazil) that had similar economic backgrounds like for Uganda.

Similar 20 year time series data for the three countries will then be pooled to form a balance panel of 60 observations. 20 year time period is considered for each country because the human development reports have been published for about 20 years since 1992. The two benchmarking countries (Ghana, and Brazil) are selected due to their fairly high economic dependency on

agriculture, and their similarity in the trends of rural poverty with Uganda. The Inclusive growth analytics framework has also been applied in the analyses of these countries.

The panel data regression model will be of the form:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + u_{it} \quad \text{.....(3.3)}$$

Y_i will be a selected development indicator: GDP, GNI per capita, HDI, IHDI or Gini Index for Uganda. Each indicator will be considered separately.

β_{1i} is the is the intercept value of individual country, and it is random with a mean value of β_1 , and $B_{1i} = \beta_1 + e_i$. Where **i =1,2,3** and **t=1,2,3.....60**, and **e_i** is the random error term having a mean value of zero and a variance of σ^2. β_1 is the common mean intercept value for the three countries, β_2, is slope coefficient, **X_2** is agricultural productivity, and **u_{it}** is the error term.

Applying the random effects approach will imply the country individual differences in the intercept values are reflected in the error term e_i, such that:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + e_i + u_{it} \quad \text{……..…… (3.4)}$$

And $$Y_{it} = \beta_1 + \beta_2 X_{2it} + \omega_{it} \quad \text{…… (3.5)}$$

Where $\omega_{it} = e_i + u_{it}$

Results of the analysis will elicit understanding on how agricultural productivity affects development across these countries. Panel data estimation is preferred because it can take into account possible heterogeneity arising from different countries (Uganda, Ghana & Brazil), provides more informative data, minimizes collinearity among variables, and gives more degrees of freedom hence efficiency. Panel data analysis will be done using E-Views.

3.10 Logistical and ethical considerations of the study

The researcher will be concerned about other peoples' quality of life, he will follow all the laws/rules of the country or relevant organizations and he will demonstrate high level of integrity without any form of compromise. He will obtain the necessary clearances (e.g. university research authorization letter). He will carefully consider the following ethics:

The researcher will avoid plagiarism and fraud; he will maintain confidentiality and anonymity of the respondents. The researcher will make every effort to avoid imparting any physical or psychological harm to subjects; he will conform to the principle of voluntary and informed consent, and if given money for this study he will not divert the money for other purposes, but strictly use it for this research.

The researcher hopes to publish the dissertation as a way of disseminating the findings so that the findings can be read and used by interested stakeholders such as farmers, government departments, and other researchers. He will also demonstrate a high level of academic freedom.

REFERENCES

Adam, S. (1776). *Nature and Causes of Wealth of Nations*. London: Edinburg. Retrieved May 4, 2014, from: http://www.adamsmith.org/wealth-of-nations

Sen, A. (1999). *Development as Freedom*. New York: Anchor Books

Barro, R. (1998). Notes on Growth Accounting. *Journal of Economic Growth*, Harvard University. Cambridge. Retrieved May 4, 2014, from: (http://www.economics.harvard.edu/faculty/barro/files/p_accounting.pdf)

Berg, Andrew, & Jonathan D, O. (2011a). Inequality and Unsustainable Growth: Two Sides of the Same Coin? *IMF Staff Discussion Note 11/08* (Washington: International Monetary Fund).

Bravo-Ortega, C., & Lederman D. (2005). *Agriculture and National Welfare around the World: Causality and International Heterogeneity since 1960*. Washington DC: World Bank PRWP Series 3499.

Chenery, H, B., & Taylor, L. (1968). Development Patterns: Among Countries and Overtime. *Economic Development Report*, 102 (1). 1-64.

Commission on Growth & Development. (2008). *Growth Report: Strategies for Sustained Growth and Inclusive Development* .Washington: World Bank.

Darmasir, L.M. (2009). Measuring Agricultural Productivity Using Average Productivity Index. *Sri Lanka Journal of Advanced Social Studies, 2(1).*

Foster J., Lopez-Calva L., & Szekely, M. (2005). Measuring the Distribution of Human Development: Methodology and an application to Mexico. *Journal of Human Development and Capabilities*, *Taylor & Francis Journals*, vol. 6(1), 5-25

Fulginiti, L., & Perrin, R. (1998). Agricultural Productivity in Developing Countries. *Agricultural Economics, 19*: 45–51.

Garido,L., & Ianchovichina, E. (2009). *Growth Decomposition and Productivity Trend*. Washington DC: Economic Policy and Debt of the World Bank.

Gujarati, D.N. (2006). *Basic Econometrics*. New York: McGraw-Hills Companies

Hausmann, R., Rodrik, D., & Velasco, A. (2005). Growth Diagnostics. *Manuscript, Inter-American Development Bank.* Accessed October 9, 2013, from: (http://www.hks.harvard.edu/fs/rhausma/new/growthdiag.pdf)

Ianchovichina, E., & Gooptu, S. (2007). Growth Diagnostics for a Resource-rich Transition Economy: The Case of Mongolia. *Policy Research Working Paper No. 4396* .World Bank.

Ianchovichina, E., & Lundstrom, S. G. (2009). Inclusive Growth Analytics Framework and Application *Policy Research Working Paper 4851. World Bank.*

Lewis, W. Arthur. (1954). *Economic Development with Unlimited Supplies of Labor*. Manchester School of Economic and Social Studies, Vol. 22, pp. 139-91.

IFAD. (2013). *Enabling Poor Rural People to Overcome Poverty in Uganda*. Rome: IFAD Retrieved January 10, 2014, from: (http://www.ifad.org/operations/projects/regions/Pf/factsheets/uganda.pdf)

IFPRI. (2012). Rural-Urban Transformation in Uganda. Kampala: IFPRI. Accessed December 10, 2013, from: (http://www.ifpri.org/sites/default/files/publications/usspwp10.pdf)

IFPRI. (2008). *Land Tenure & Agricultural Productivity in Uganda*. Kampala: IFPRI

International Monetary Fund. (2009). *World Economic Outlook 2009*. Washington DC: IMF. Retrieved January 12, 2014, from: http://www.imf.org/external/pubs/ft/weo/2009/01/pdf/text.pdf

International Monetary Fund. (2014). *World Economic Outlook (WEO) Update*. Washington DC: IMF Accessed January 12, 2014 from: http://www.imf.org/external/pubs/ft/weo/2014/update/01/

Kostas, S., & Alberto, Z/FAO. (2003). Agriculture and rural Development in the 21st Century. *ESA Working Paper No. 03-17, pg 33 -35.* (ftp://ftp.fao.org/docrep/fao/meeting/010/ae885e.pdf)

Kuku,O., Ajibola, A., & Saweda, L. (2011). A Review of Literature on Agricultural Productivity, Social Capital and Food Security in Nigeria. *NSSP Working Paper No. 21. Abuja: IFPRI*

Lewis, W. Arthur. (1954). Economic Development with Unlimited Supplies of Labor. Manchester School of Economic and Social Studies, Vol. 22, pp. 139-91.

Ligon, E., & Sadoulet, E. (2007). Estimating the Effects of Aggregate Agricultural Growth on the Distribution of Expenditures. *Background paper for the WDR 2008*. Washington: World Bank

Mugenda,O.M., & Mugenda, A.G. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: ACTS

Mujumdar, N.A. (2007). *Inclusive Growth: Development Perspective in Indian Economy*. New Delhi: Academic Foundation.

Nabbumba, R., & Bahiigwa, G. (2003). *Agricultural Productivity Constraints in Uganda: Implications for Investments.* Kampala: Uganda.

Olayide, S.O., & Heady, E. O. 1982. *Introduction to Agricultural Production Economics.* First Edition. Ibadan: Ibadan University Press.

Republic of Uganda. (2013). *Statistical Abstract 2013*. Kampala: UBOS.

Republic of Uganda. (2010a). *Statistical Abstract 2010*. Kampala: UBOS.

Republic of Uganda. (2010b). *Uganda National Household Survey 2009/10.* Kampala: UBOS.

Republic of Uganda. (2011). *Background to the Budget, 2011/12.* Kampala: MFPED

Ministry of Agriculture, Animal Industry and Fisheries. Retrieved February 10, 2014, from: http://www.agriculture.go.ug/userfiles/Statistical%20Abstract%202011.pdf

Republic of Uganda. (2013). *Background to the Budget, 2013/14.* Kampala: MFPED

Republic of Uganda. (2009). *2009 Statistical Abstract*. Kampala: Uganda Bureau of Statistics.

Shaw, G. (2005). *Voices from the Bush: context and learning in rural and remote settings. Dealing with diversity.* Darwin, NT: Charles Darwin University Press.

Singh, J., & Dhillion, S. S. (2000). *Agricultural Geography* (2nd ed.) New Delhi : McGraw Hill.

Todaro, M.P., & Stephen, C.S. (2004). *Economic Development*. Singapore: Pearson Education.

Todaro, M.P., Stephen, C.S. (2011). *Economic Development.* New York: Addison Wesley.

UNDP. (2007). *Human Development Report 2007/08: Fighting Climate Change*. New York: UNDP

UNDP. (2013). *Human Development Report 2013: The Rise of the South*. New York: UNDP

United Nations. (2014). UN Network on Food Security and Rural Development. Agriculture. Accesses March 30, 2014, from: http://www.rdfs.net/themes/agriculture_en.htm

World Bank. (2008). *World Development Report 2008: Agriculture for Development*. Washington DC: World Bank

World Bank. (2009). *World Development Report 2009: Geography in motion*. Washington DC: World Bank

World Bank. (2014). Poverty Overview: Accessed April 20, 2014, from: http://www.worldbank.org/en/topic/poverty/overview

World Bank. (2001). *PRSP Progress Report, 2001*. Washington DC: World Bank

World Bank. (2014). Agriculture and Rural Development. Accessed June 4, 2014, from: http://data.worldbank.org/topic/agriculture-and-rural-development

World Bank. (2014). World Bank and Agriculture in Africa. Accessed March 20, 2014 from: http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21935583~pagePK:146736~piPK:146830~theSitePK:258644,00.html

World Bank. (2014). GNI per capita, Atlas method. Accessed May 5, 2014, from: http://data.worldbank.org/indicator/NY.GNP.PCAP.CD

World Bank. (2014). Haiti: the Challenges of Poverty Reduction. Accessed May 10, 2014, from: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20207590~menuPK:435735~pagePK:148956~piPK:216618~theSitePK:430367~isCURL:Y~isCURL:Y,00.html

World Bank. (2014). Food Crisis: The Role of Agricultural Productivity. Accessed April 15, 2014, from: http://blogs.worldbank.org/developmenttalk/food-crisis-the-role-of-agricultural-productivity

Zepeda, L. (2001). *Agricultural Investment, Production Capacity and Productivity.* Geneva: FAO

APPENDIX I: QUESTIONNAIRE

Mbarara University of Science & Technology
P.O. Box 1410, Mbarara – Uganda
Tel: +256 782 393636 /+256 794 393636
Email: amonewb@gmail.com
Date:……

Dear Respondent,

RE: QUESTIONNAIRE FOR FARMERS

I am a student of Mbarara University of Science and Technology undertaking a research which is part of my PhD study program. The research aims at assessing the impact of agricultural productivity on economic development in Uganda.

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

William Amone
PhD Student, MUST

A. GENERAL QUESTIONS

1. Where do you stay? Region……. District……
County…….. Sub-county…… Village……

2. What is your gender?
(1) Male (2) Female

3. How old are you?
(1) Under 21 (2) 21 – 35 (3) 36 -50
(4) 51- 65 (5) Over 65

4. What is you marital status?
(1) Married (2) Single
(3) Divorced (4) Widowed

5. What is your highest level of formal education?
(1) No education (2) Primary (3) Completed O' level
(4) Completed A' level (5) Diploma (6) Degree

B. AGRICULTURE AND AGRICULTURAL PRODUCTIVITY

6. What is your main occupation?

(1) Farming (crop/livestock/fisheries/forestry) (2) Business/Trade
(3) Civil service (4) Casual laborer (5) others (specify) ……

7. If farming, which specific farming activities do you undertake?

(a) Crop production (b) Livestock (animals & birds)
(c) Forestry (d) Fisheries

(1) a (2) b (3) a & b (4) a, b & C (5) a, b, c & d (6) c or d

Specify the crop/bird/animal/tree:……..

8. What is your farm size? (In acres)

(1) < 3 (2) 3-6 (3) 7-10
(4) 11-14 (5) 15-18 (6) >18

9. How did you gain access to the farm land that you are using?

(1) Own (bough/family land/permanently given)
(2) Renting (3) Temporarily given to use for free

If you are renting how much do you pay in a year per acre? ……

10. Which of the following inputs do you use in your farm?

(1) Fertilizers (2) Tractors (3) Irrigation
(3) Pesticides (4) Animal vaccines and drugs

For those you are not using, explain why you are not using……

11. If you are dealing in crops, how many times do you weed your crop before harvesting?

(1) Once (2) Twice (3) Thrice (4) More than thrice

12. Which natural hazard(s) often affect your farm yield/output?

(1) Drought (2) Flood (3) Wind
(4) All (1, 2 &3) (5) None of them

13. How much money do you pay for the following?

Code	Activity	Amount		Code	Activity	Amount
1	Plowing			6	Harvesting	
2	Tilling			7	storage	
3	Planting			8	Transport to the market	
4	Weeding			9	Land rent (if applicable)	
5	Spraying			10		

14. What is your annual average crop yield per acre in bags? (each bag = 100kgs)

(1) < 10 (2) 10 – 19 (3) 20 - 29

(4) 30 -40 (5) > 40 Specify the crop(s) ……

15. What is your annual average livestock production per acre?

(1) < 10 (2) 10 – 19 (3) 20 - 29

(4) 30 - 40 (5) > 40 Specify the animals/birds…….

16. How do you rate your farm productivity?

(1) Very low (2) Low (3) High (4) Very high

17. How much is the average price of your product?

Code	Crop/Bird/Animal	Price (per kilogram)
1		
2		

18. Productivity estimate:……

……

Note: Agricultural Productivity = Value of total Farm Outputs

Value of total Farm Inputs

19. Are the following infrastructures functional and accessible around your farm area?

Code	Infrastructure		Code	Infrastructure
1	Road networks		5	Crop & Livestock Market
2	Railways		6	Banking & insurance
3	Irrigation facilities		7	Electricity
4	Communications (telephone/internet)		8	Tap Water

For those missing, how have they limited your farming business or its productivity……...……

20. What factors have limited/constrained your farm productivity?

Code	Factors		Code	Factors
1	Limited land/poor land tenure		6	Pests and diseases
2	Lack of capital for buying inputs /farm implements		7	Limited farming skills/knowledge
3	Natural hazards: drought, flood, wind, bad weather etc		8	Poor transport & storage facilities
4	Low prices of the products		9	Lack of workers for weeding & harvesting
5	Lack of market for the farm products		10	Others: specify…….

21. How do you plan to solve the constraints so as to increase your farm productivity? ……

22. Have you ever been supported by the government or NGOs on farming?

(1) Supported by government (2) Supported by NGOs

(3) Never been supported

If you were supported, state the support(s) that you received?……

……

23. Do you feel the government or the NGOs should support (or continue to support) farmers in your area?

(1) Yes (2) No

Explain ……..

24. Select the support that you need in order to improve your farm output.

Code	Type of support		Code	Type of support
1	More land/land reforms		4	Education/training
2	Financial support/credit		5	Transport/storage/processing facilities
3	Market access		6	Others (specify)…….

25. Ugandan government has been providing the following support to farmers through NAADS.

Code	Support
(a)	Advisory/extension services
(b)	Agribusiness & market linkages (skills & efficiency)
(c)	Farmers' institutional development (seeds, animals, drugs etc)
(d)	Monitoring and evaluation

Which support(s) did you receive under NAADS?

(1) A few of the above (e.g. a &b) (2) Majority of them (e.g a, b, & c)

(3) All of them (a, b, c & d) (4) Did not receive any.

26. How do you rate the services of NAADS provided to farmers in your area?

1. Excellent 2. Good 3. Fair

4. Poor 5. Very poor

27. Do you think some NAADS services need revision/improvement?

1. Yes 2. No

If yes, explain…….

……

C. RURAL EMPOWERMENT AND ECONOMIC DEVELOPMENT

28. Have you had any formal training in relation to your main occupation?

(1) Yes (2) No

29. Do you own the following assets?

Code	Asset	Quantity		Code	Asset	Quantity
1	Land (in acres)			5	Bicycle	
2	House (iron/tile roof)			6	TV/Radio	
3	Car(s)			7	Mattresses	
4	Motorcycle			8	Phone	

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

Code	Monthly income (in shs)		Code	Monthly income (in 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

31. Do you plan to increase your income?

(1) Yes (2) No

If yes, how do you plan to achieve that?……

32. Do you save part of your income?

(1) Yes (2) No

33. Approximately what percentage of your income do you save?

Code	Percentage saved		Code	Percentage saved
1	Less than 10%		3	25-40%
2	10 -24(%)		4	More than 40%

What do you plan to do with the savings in the future? ……

34. How do you save your money?

Code	Method of saving		Code	Method of saving
1	Bank account (e.g. savings, fixed etc)		4	Buy securities (bonds, TBs, Shares)
2	Stokvel Method (farmers/savings group)		5	Telephone money services (mobile money, Airtel money, Msente etc)
3	In the house (piggy bank)		6	Others, specify……..

35. How many times have you picked loan(s) from the bank?

Code	Number of times		Code	Number of times
1	1-2 Times		3	More than 4 times
2	3-4 times		4	Never picked

36. If you never got a loan, why haven't you?

Code	Reasons for not getting a loan		Code	Reasons for not getting a loan
1	Do not have a security		4	Not capable of repaying
2	Fear the interest/charge (too high)		5	Others, explain……
3	There are no nearby banks			

37. Apart from farming which other economic activities do you do that earn you money?

Code	Other non-farm activities		Code	Other non-farm activities
1	Retail (small-scale) sales		6	Textile weaving/knitting
2	Crafting/jewelries production		7	Writing/reproduction of recorded media
3	Mining		8	Carpentry & wood production
4	Metal work/fabrication		9	Brick making
5	Processing beverages/local drinks		10	Hunting & trapping

END

THANK YOU FOR YOUR VALUABLE TIME

APPENDIX II: INTERVIEW SCHEDULE

1. Do you consider the people of this village to be poor? If yes; explain the causes and the extent of poverty in this village.

2. In your own view what should be done to alleviate poverty and improve the income/wellbeing of the people in this village?

3. How many schools (primary/secondary/tertiary) are in your sub-county? Do the schools have enough teachers, good library, good laboratory? Are the pupils/students performing well? Discuss their quality.

4. Do you think this area needs more schools? Explain why.

5. Is there any government hospital (health center) in your sub-county? If yes, is the hospital well equipped with the necessary facilities? Explain. If no, how has the absence of a government hospital affected economic activities in your area?

6. What proportion of farm products (output) do people in this area sell for money on average? How can this proportion be increased?

7. Describe the types of farms in this area? (small/large/commercial/mechanized/mixed etc)

8. What factors still constraint farm productivity in the area? What should be done to increase farm productivity in this area?

9. What factors limit trade in this area? How can trade be enhanced in this area?

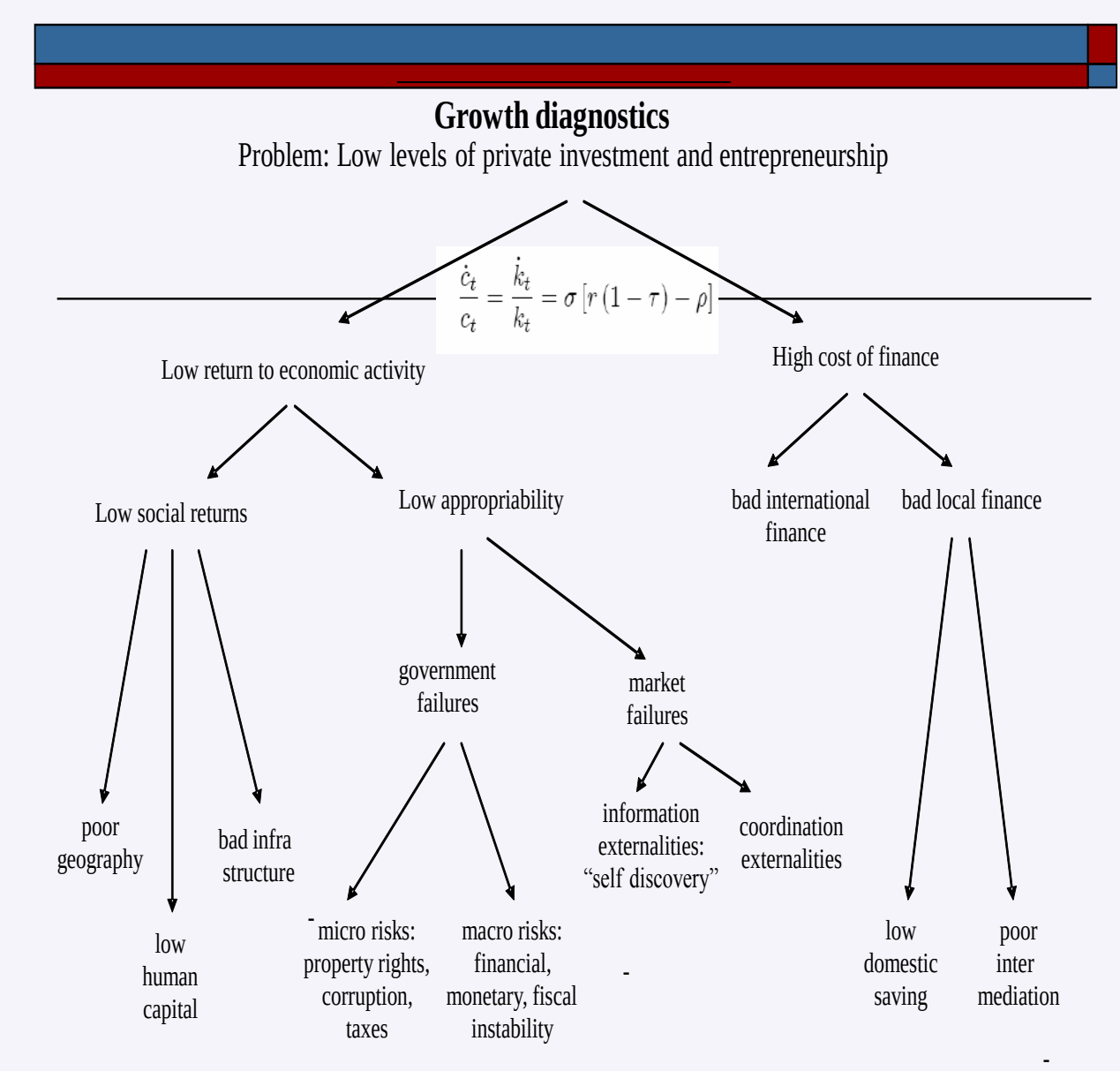
10. The government of Uganda has been supporting farmers through NAADS, providing: advisory/extension service, agribusiness & market linkages, farmers' institutional development, and monitoring and evaluation. What are the benefits, limitations and possible ways of improving these services in your area?

11. Which non-farm economic activities can the people of this area engage in order to earn them supplementary income? Why do you think those activities are suitable in this area? What external support could be suitable to enhance those non-farm economic activities in this area?

12. Are there some people who are unemployed and idle in this village/sub-county? If yes, approximately what percentage of the population? What should be done so as to create productive work for those unemployed people?

13. What approaches should be used to develop Uganda's agriculture? Hint:
(a) Improvement approach: involves agricultural improvements within the existing system.
(b) Transformation approach: involves complete change (technical, social, & legal systems) to foster modernization e.g. adopting the use of tractors, combine harvesters etc
Explain how the approach should be implemented.

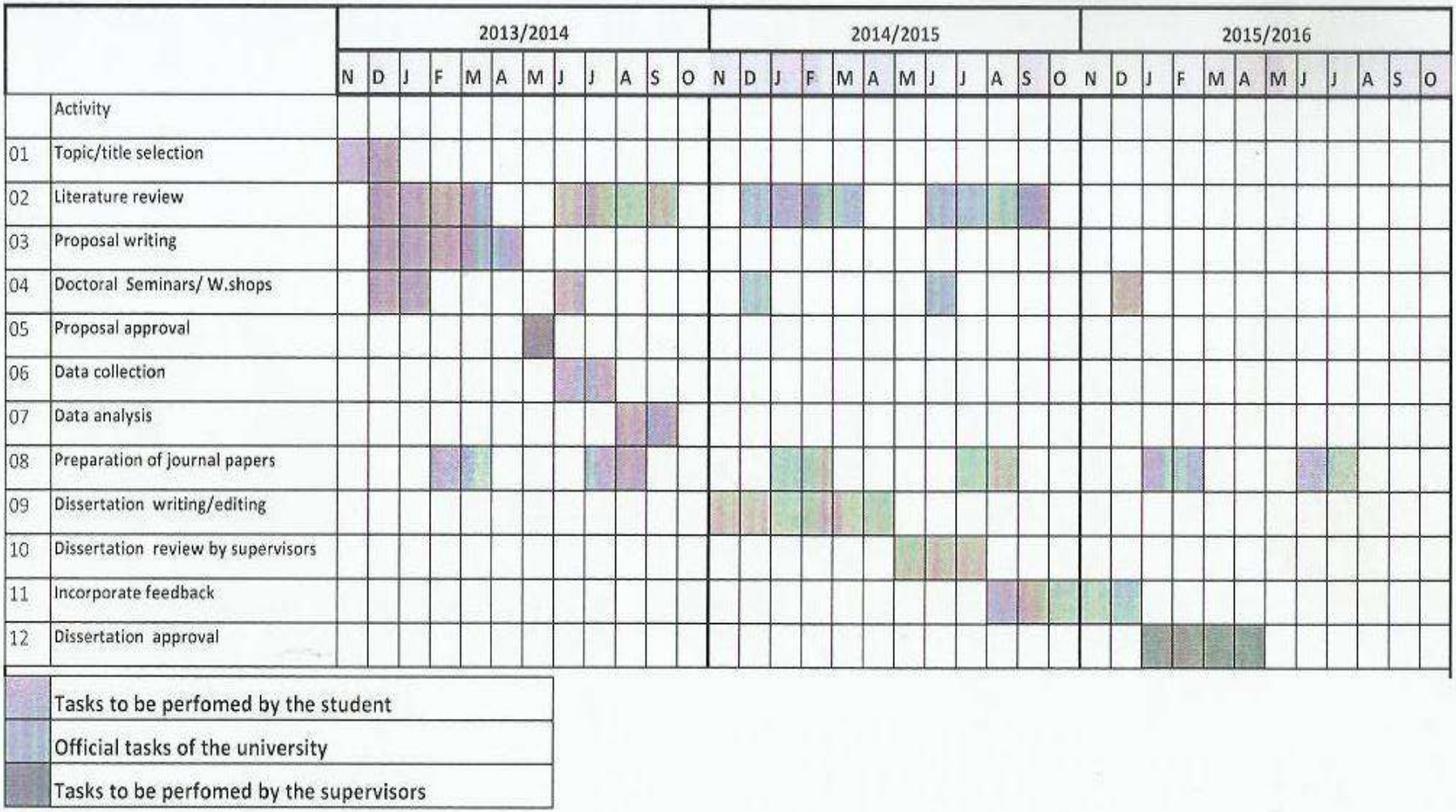
APPENDIX III: HRV GROWTH DIAGNOSTICS



Source: HRV (2005)

APPENDIX IV: WORK PLAN AND TIMEFRAME

Student's Name	Amone William
Student's Reg. No.	2013/PhD(Econ)/088/PS
Supervisors	1. Prof Makombe Godswill 2. Prof Kamuganga Dick
Topic/ Title	Agricultural Productivity and Economic Development in Uganda: An Inclusive Growth Analysis
Current Stage	Proposal approval



APPENDIX V: RESEARCH BUDGET

S/N	Item	Quantity	Rate (Ug. Shs)	Amount (Ug. Shs)
1	Stationeries (books, pens, papers, ink etc)	01 set	850,000	850,000
2	Internet	24 months	45,000	1,080,000
3	Subsistence allowance	40 days	40,000	1,600,000
4	Travel (vehicle hire)	40 days	80,000	3,200,000
5	Photocopying (questionnaires, interviews & others)	500 sets	1,500	750,000
6	Research assistant	40 days	50,000	2,000,000
7	Secondary data access + compilation	04 sets	200,000	800,000
8	Data processing & analysis using SPSS & E-views	02 sets	400,000	800,000
9	Report production (printing & binding)	06 books	85,000	510,000
10	Honorarium	01 person	750,000	750,000
	Total			**12,340,000**
	Contingencies (5%)			617,000
	Grand Total			**12,957,000**