GOVERNMENT BUDGETARY ALLOCATION AND ITS EFFECT ON AGRICULTURAL GROWTH

By

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Management of the University of Nairobi

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DECLARATION

This research project is my original work and has not been submitted for a degree in any other university.

Signature .................................... Date ....................................

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X51/80893/2012

This research paper has been submitted for examination with our approval as University supervisors.

Signature ................................. Date .................................

Dr. George Ruigu
DEDICATION

This research paper is dedicated to my late mum Suldana Hussein Dagane who against all odds managed to take me to school through her determination and great sacrifice. I was doing all this for you.
ACKNOWLEDGEMENTS

I would first like to thank the almighty God for the good health, strength, courage and determination that he accorded to me during the period that I was undertaking this programme. Secondly, am grateful to all the staff at the School of Economics for making it possible for me to undertake this M.A course. Special thanks to my supervisor Dr. George Ruigu with whose support, guidance, constructive criticism and useful suggestions, I was able to complete this research work. He always had time for me even on short notice despite his busy schedules. I am also grateful to my colleague students for assistance they offered to me throughout the period of our study.

I express my profound gratitude to my mum Suldana Hussein Dagane who against all odds managed to take me to school through her determination and great sacrifice. To her I say thanks a lot and may God rest your soul in eternal peace. It is not possible to mention each and every person for the role played to enable me to complete my course successfully but nevertheless I am grateful to them. All the same I am responsible for any errors and omissions in this research paper.
ABSTRACT

Agriculture remains the pillar of the Kenya’s economy since independence. Literature points out existence of high correlation between agricultural growth and economic growth. The country has implemented several development plans with each identifying agricultural sector as among the important sectors that can lead to realization of set development goals. Agriculture in the country has experienced robust growth rates in the 1960s and 1970s to its dwindling growth in the 1980s and 1990s. However, the sector registered mixed performance from the year 2000 to date. A number of initiatives have been pursued with an aim of improving the productivity of agricultural sector and the economy as a whole. There is need to establish appropriate policies that should be implemented to enable sustainable increase in the agricultural output. This study examined government budgetary allocation and its impacts on agricultural productivity in Kenya. The study utilized annual data for the period from 1982-2014. A regression analysis was done using ordinary least squares (OLS) method to evaluate the significance of the factors. The study results revealed that agricultural output is responsive to both price and non-price factors. Specifically, agricultural price index, budgetary allocations, input price index and weather patterns were found to be statistically significant in determining agricultural productivity in Kenya. The study therefore recommends for an integrated policy regarding enhanced support for the sector to enable performance in agriculture sector.
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<table>
<thead>
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<tbody>
<tr>
<td>ABAL</td>
<td>Agricultural Budgetary Allocation</td>
</tr>
<tr>
<td>APR</td>
<td>Agricultural Productivity</td>
</tr>
<tr>
<td>API</td>
<td>Agricultural Price Index</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization</td>
</tr>
<tr>
<td>IPI</td>
<td>Input Price Index</td>
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<td>PGR</td>
<td>Population Growth Rate</td>
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CHAPTER ONE
INTRODUCTION

1.1 Background

The main agent for development in most African countries is Agriculture. The decade before the new millennium (1990s) contributed to this sector’s importance when nations all over the globe concentrated on the persistent problems and challenges of hunger and poverty. Consequently, in the recent past, as a result of the 2008 food price crisis, agriculture maintained its relevance as it was the core sector in Africa emphasized in the World Food Security Rome Declaration (FAO, 1996) as well as in the United Nations Millennium Development Project (UN, 2001). This therefore instigated the adoption of a Millennium Declaration at the Millennium Summit back in New York in the year 2000 which led to amalgamation of different international development goals established in the 1990s into an overall development agenda whereby elimination of poverty and hunger was prioritized.

To grow agricultural sector, a number of African countries committed to raise allocation of financial resources. They committed to allocate up to 10% of their national budgets’ to Agriculture (NEPAD, 2002). According to the World Development Report (2008), in 25 years for the first time, there was emphasis on the importance of agricultural development. They pointed out and considered agriculture as a prime option in order for Africa to overcome poverty and food insecurity as well as achieve economic growth (World Bank, 2008).

The best prospect for economic growth in Africa is offered by Agriculture. This could be seen through its huge development associated with its contribution to the economic growth and government revenue in Kenya. Therefore, to spearhead economic recovery, there is a
need for more resources towards this sector. On the other hand, to ensure that the allocated resources are efficiently utilized, appropriate measures need to be put in place. According to Kenya’s vision 2030, covering the period 2008 to 2030, Agriculture is seen as a subsector relevant as well as necessary at making Kenya a newly industrialized and middle income country thus providing high value of life for the general population.

Therefore, Kenya as a nation and a developing economy became party to the African Union’s Maputo Declaration which focused on Agriculture and Food Security. This commitment was all aimed at implementing with urgency the Comprehensive Africa Agriculture Development Programme (CAADP) which aimed at helping African countries attain and maintain a higher path of economic growth. This was to be attained through agriculturally led development that reduces majorly three problems that is bulk poverty, food insecurity and hunger. The program was meant to reduce poverty and hunger by half by 2015, through the pursuit of a 6% average annual growth in the agriculture sector and allocating an average of 10% of national budgets to the sector. This was to contribute greatly to successful implementation especially, where the government and other African governments had to put in place the Strategy for Revitalization of Agriculture (SRA) and the Agricultural Sector Development Strategy which almost and actually failed to receive equal budgetary commitment.

1.2 Kenya’s Agricultural Sector

In Kenya, Agriculture is indicated as the major sector or the backbone of the economy. Despite declining contribution of this sector to the economic growth (from 35% in 1964 to 26% in 2009), its tremendous contribution to general development is so far vital (Agricultural Sector Development Strategy, 2010). Approximately 26% and 25% of the economic growth is contributed by agricultural sector directly and indirectly respectively. Further, it is shown
that the manufacturing sector benefits from this sector with raw materials. On the other hand, its vitality is the benefits trickling down to the economy as a whole from the generates tax revenue and foreign exchange (GOK, 2004). Above 40% of the total population as well over 70% of the rural population is employed in this sector. Further, about 60% of Kenya’s export earnings are estimated to be as a result of this sector. This has spurred positively the reflected relationship between its performance and that of the economy as a whole for a long period of time. For the non-agricultural sector, this sector is termed as the growth engine coupled with the multiplier effect (Block and Timmer, 1994). Thus, Agriculture is the backbone of most economies of the developing countries such as the Kenyan economy.

The sector provides food to most people in the country including industrial workers, thus, the agricultural sector is the single most important determinant of overall economic growth. Increased production in the sector, particularly that of small scale farmers can lead to rise in income which would further lead to increased consumption and savings, which are pre-requisites for expansion of the economy. Further, increased production of export crops can provide higher foreign exchange earnings to finance importation of intermediate or capital goods. Growth of the sector can also stimulate both forward and backward economic relationships with other sectors in the economy and can thus reduce reliance on imported raw materials. The above reasons make the sector to be singled out in all development plans as among the sectors expected to contribute significantly to realization of set development goals. The agricultural sector is among the six priority sectors as indicated in vision 2030 that has the potential of raising economic growth rate to be at par to that of the the region of 10% in a number of years. The other sectors are tourism, trade, manufacturing and finance. The agricultural sector is anticipated to contribute greatly among the six sectors in poverty reduction as it provides livelihoods to most people.
Figure 1.1: Trends in Agricultural Performance in Kenya (1961 – 2014)


The growth of the national economy in Kenya is highly connected to agricultural growth and development. It is in record that the agricultural sector in the 1960s and 1970s experienced the most impressive growth in sub-Saharan Africa. The growth hit an average rate of 6% and 7% per year for agriculture and for the national economy respectively. These first two decades immediately after 1963, saw small scale agriculture grow fast as the population rallied around farming thus political good will. Because of availability of ample land and better use of existing technologies, the growth in this sector was consequently spurred. Agricultural extension and research were sustained by the government and more critical agricultural organizations including farmers’ cooperatives were established and reinforced by the government. This is the period which saw an allotment to the sector to the tune of 13% on average considering the national budget.
Despite those huge steps, this growth was not persistent. During the third and fourth decades after independence, agricultural sector recorded an average annual growth rate of 3.5% to an average rate of 1.9% in the late 1990s. However, since the era of the new regime in 2003, the sector has been performing relatively well. It was later discovered that low investment in the sector, mismanagement, virtual collapse of the agricultural institutions and more importantly, negligence of the agricultural extension and research were among the cited reasons for the decline. Consequently, the government had started implementation of Structural Adjustment Programmes (SAPs) as agreed by the Bretton woods institutions. This SAPs encouraged poorly sequenced privatization in the sector. With budgetary allocation declining to as low as 2% of the national budget, there was low investment on the other hand in the sector during this period.

The rate of growth declined from 4.4% in 1996 to 1.5% in 1999 and further to minus -1.2% in 2000. There followed a fluctuating performance in the sector which recorded 10.5% growth in 2001; then dropped to -3.0% in 2002 before recovering in 2003 and declining to 1.6% in 2004. This slowdown was attributed to deprived performance in coffee, maize and pyrethrum sub-sectors. However, an impressive performance of the sector was experienced in 2005 when it recorded 6.5% growth rate and further expanded to about 7.6% in 2006. The performance of the agricultural sector has been mixed over time and this has been seen as dependent on the policy reforms in a particular period. To see the best outcome of these policy reforms, it requires analyzing the effect of different policies on the development of the major sub-sectors of the agricultural sector. These effects are revealed in the volumes of the produces yielded and sold and the prices received by the farmers.
The new government of Kenya in 2003 established Economic Recovery Strategy for Wealth and Employment Creation (ERS) as the blue print for setting the country back on the growth path. This strategy was meant to modify the existed planning documents that emphasized reduced poverty as opposed to creation of wealth as well as employment. Further, the strategy expounds on effect of agricultural sector while recognizing for a need of growing agricultural faster so as to improve the economy, wealth creation as well as employment. This made the sector to be given high importance and priority in this programme (ERS).

As a response and follow up to ERS, Strategy for the revitalization of agriculture (SRA) was developed and launched in 2004 by the government. The strategy set out the vision of the government as to transform the agricultural sector into a profitable, commercial and regionally and internationally competitive economic action that leads to high value beneficial especially on employment to Kenyans citizens. The target set out by SRA involved growth of the sector by about 3.1% to 5% in 2003 and 2007 respectively.

By 2007, Strategy for the revitalization of agriculture (SRA) had been successfully implemented. This saw the overall growth in agricultural sector exceeding SRA target whereby the average growth rate of 5.2% and continued growing to 6.4 % in 2006. SRA further achieved the following; increased food security by 12% and reduction of poverty by 10% from 2003 to 2007, increased productivity of the main agricultural produce like tea, maize, sugar, horticulture, milk and meat each by an average of 6% per year from 2003 to 2007 leading to revival of many institutions in this sector.

Being a five year plan, ERS was set to expire during the 2007/2008. As a result, by early 2007, the Government embarked on developing a new strategy to succeed the ERS. In June
2008, the government launched Kenya Vision 2030 as a long-term development blueprint for the country (Government of Kenya, 2007). The vision has identified agriculture as one of the vital sectors to deliver the 10% annual economic growth as envisioned within the economic pillar.

Following the attainment of most SRA targets, it necessitated the revision of SRA to capture these new developments. The government developed a new strategy that provides a guide for public and private sector to overcoming development challenges facing agricultural sector (Government of Kenya, 2010). This strategy was perceived to be the Agricultural Sector Development Strategy (2009 -2020) whose main intention was to harness public and private sectors’ efforts in overcoming agricultural sector challenges as well as ensuring food and nutritional security for all Kenyans. The strategy aims at higher income generation and employment especially for rural areas. Furthermore, it is expected to position the agricultural sector as a key driver in achieving the 10 per cent annual economic growth rate envisaged under the Vision 2030’s economic pillar.

1.3 Problem Statement

Budgetary provisions for specific agricultural programmes or projects are often made under several sub-sectors (CBN, 2003). Budgetary analysis thus serves as an important tool that helps to promote economic assessment of all sectors including the agricultural sector, and it is useful for planning and management at the farm level (Abang, Agom, Enyenihi, & Ele, 2008). In promoting increased agricultural production, Government budgetary allocations make capital available for agricultural production by helping to secure inputs, technology and management leading to growth and development of the sector (Douillet & Grandval, 2011).
Agriculture has been the engine of growth and the key pillar of the Kenyan economy. Further, it is known to contribute about 24% of GDP and employing about 62% of the national labor force. Agricultural sector contributes 65% of Kenya’s exports and more than 80% of the Kenyan population especially rural dwellers makes a living directly or indirectly, from the sector. Likewise, policies affecting the agricultural performance have significant implications for the economy in totality. Under the vision 2030, the country aims to increase and maintain annual GDP growth rates at 10%. The agricultural sector has been identified as among the priority sectors that plays crucial role in the realization of this ambitious goal.

However the sector has performed poorly affecting almost all forms of agricultural farming in crop and livestock with horticulture being only exception, which has maintained an impressive performance while growth in all key cash crops has declined. The Food and Agricultural Organization (FAO) recommends that 25 % of government capital budget be allocated to agricultural development (FAO, 2009). This has not been achieved by the various administrations of Kenya, thereby affecting government programmes and policies for the sector.

Kenya has also consistently failed to reach the 10% agriculture budget standard as indicated in the Maputo declaration, which has also led to negative implications for food security. The total agricultural expenditure, as a proportion of the overall expenditure, fluctuated from 8.244 per cent between 1980 – 1990, to an average of 3.61% per annum between 1990 – 2000, to 4.5% between 2000 – 2013; this reflects a reduction in agricultural expenditure over the years relative to the overall expenditure leading to inadequate funding for the agricultural sector and this is largely attributable to the structural adjustment programs which reduced the budget for extension services and subsidies for farmers. The International Food Policy
Research Institute (IFPRI) observed that by increasing the allocation of government spending to 10% involving investments in irrigation, agricultural research and extension services to farmers would lift about 1.6 million people above the poverty line. This study endeavors to measure the effect of government budgetary allocation to the agricultural sector on agricultural growth in Kenya.

1.4 The Research Questions

The study aims to answer the following research questions;

i). What has been the pattern of budgetary allocation to the agricultural sector overtime by the government of Kenya?

ii). What is the relationship between budgetary allocation to the agricultural sector and agricultural growth in Kenya?

iii). What should be done to increase budgetary allocation to the Kenyan agricultural sector?

1.5 Objectives of the Study

The main objective of the study is to investigate the link between government budgetary allocation to the agricultural sector and its effect on agricultural growth in Kenya from an econometric perspective.

The specific objectives are to:

i). Examine the patterns of budgetary allocation to the agricultural sector overtime by the government of Kenya.

ii). Establish the relationship between agricultural growth and budgetary allocation to the sector in Kenya.
iii). Make policy recommendations on budgetary allocation to the agricultural sector and agricultural growth based on (i) and (ii) above.

1.6 Justification and Significance of the Study

Due to substantial policy and structural changes that have been observed in the Kenyan economy over the years, this study attempts to provide an empirical analysis of the impact of government budgetary allocation to the agricultural sector and its implication on agricultural growth.

This study is useful to the stakeholders who include the government and policy makers since it will provide insights on the effects of government budgetary allocation to the agricultural sector on the agricultural growth. The study will result in recommendations that will be useful in policy formulation for budgetary allocation. This will result in improved agricultural growth and hence economic growth.

In the academic field the research will first shed more light on the link between budgetary allocation and agricultural growth and create interest among scholars to study more on this area. The research findings obtained from this study will form the basis for further studies by other scholars and researchers who might be interested to carry this subject further on.

1.7 Organization of the Study

Subsequent to this introduction is chapter two on literature review which provides theoretical and empirical reviews on effects of budgetary allocation on agricultural growth. The third chapter provides the econometric methodology to be used in the study including the definition, justification of variables and estimation procedures. Chapter four shall provide
detailed empirical estimation results including the discussion on the results and chapter five shall provide the summary of the study, deduced conclusions and policy recommendations including any further possible area of research.
2.1 Theoretical Literature Review

2.1.1 Musgrave- Rostow’s Theory

This theory takes government expenditure as a pre-requisite of economic development, its level being relatedly directly to the level of growth that a country has reached. The theory postulates that investment especially public investment measured as a percentage of the total investment of the economy is found to be high at the initial stages of economic growth and development. To gear up the economy for takeoff into the middle stages of economic and social development, the theory suggests for presence of social infrastructures outflows in the public sector. These includes roads, transport infrastructure, sanitation services, law and order, health, education and other investments in human capital, which are all necessary (Musgrave and Musgrave, 1989).

The theory maintains that the government endures to fund investment goods in this stage (middle stages) of growth. However, there is complementarity of public investment to the growth and improvement in private investment. Considering the two stages of development, there is presence of markets failures which can potentially aggravate the push towards maturity. This may increase government participation in dealing with the emerging market failures. However, income maintenance programs and policies designed in the mass consumption phase so as to redistribute welfare improvement expressively relative to other items of government expenditure as well as relative to GNP (Musgrave and Musgrave, 1989).

According to Brown et al., (1996) the productive expenditure of the public sector is ignored by the theory which also makes an assumption which may not be the case always that the government plays the major role in development.
2.2 Agricultural Growth and Budgetary Allocation

Due to scarcity of resources, a budget acts as an important tool for economic planning as well as necessary tool for effecting good planning which leads to effective mechanism for managing not only the economy and the scarce resources (Petershie, 2008). Financial allocations provide factors of production such as capital, labour, land and all other resources used in production in the agricultural sector. According to Ozor et al, (2007) government can co-partner with farmers to enhance provision of funds for agricultural production and technology transfer. To expand scope of operations, research, investment and production in the agricultural sector, effective and timely provisions and other forms of agricultural (farm) credits including insurance provisions from the government often help (Ibitoye, 2012). Government often makes budget provisions in different levels for agricultural development in Kenya. However, the extent to which budget allocations improve and promote agricultural sector and the economy in return has not been revealed.

More often than not, the government budgets are made to stimulate economic growth and thus poverty in the economy. Since rural economy in Kenya is almost solely dependent on agriculture, it makes alleviating poverty a challenge especially in the rural areas when agricultural growth and development are still not achieved (IFAD, 2013). Studies show for a need of provision of enough attention and funds to promote basic supportive infrastructure. This includes stable electricity supply, markets, good access roads and affordable transport system, as well as improved agro-allied industry in the country (Ekpebu & Ukpong, 2012). There is a need for knowledge of how agricultural activities are developed with consideration of other support links that all-together promote improvement in agricultural sector. This is basically as a result of examining the funds allocated to this sector.
Inadequate capital, poor technology and low quality inputs contribute to food scarcity and poverty in Kenya and among most of other developing countries. According to Taiwo, (2001) this is associated with reduced agricultural production which may be achieved through increased budgetary allocations under efficient management. Proper utilization of resources allocated to the agricultural sector can lead to a lasting valuable outcome leading to a greater positive impact on productivity and economic development in the country.

Enhanced integration of other sectors is necessary in promoting increased investment and productivity in agriculture which may involve partnership between industries such as manufacturing and financial sectors. Similarly, to farmers, it leads to promotion of agricultural development, which enhances better livelihood for the population (Ogunlade et al., 2009). Thus increase in budgetary allocations especially to the agricultural sector remains a top strategy of achieving high agricultural productivity as well as poverty minimization. The designed partnership has the potential of promoting enhanced research and technology similar to provision of adequate resources necessary in increasing production. Therefore, necessary frameworks should be put in place thus promoting viability, compliance, monitoring and adequate implementation by different sectors of the economy for budget to succeed. On the other hand, allocations from the government to this sector need to be properly monitored in promoting growth as well as development of the sector. Further enhancement of sustenance in increase in the allocation of resources accounted for the agricultural sector as long as such increases are necessary to accelerate growth of the sector should be considered and thus prioritized.

National budgets are shown be conspicuous in modern economic management. Budgetary allocations aid in planning and forecasting revenue inflow and expenditure (Akande et al.,
Also national budgets contribute largely in the structure, patterns, inter-sectorial links and the allocation to sectors in accordance to national priority of the government.

Allocation in the agricultural sector brings the desired effect in other sectors of the economy through relevant linkages. Prior to the last decade, agricultural sector globally grew at an average rate of 2.6% whereby two-thirds of this growth was as a result of Asian economies. For example, in Asia, Agricultural sector activities led to an increase at an average rate of 2.8% from the same period Kenya gained independence. This productivity in Asia economies was largely attributed to utilization of high-yielding seed varieties and the concentrated use of inputs such as fertilizer. On the other hand, in Sub-Saharan Africa, the average rate of agricultural growth was 3% over the same period but growth per capita of the agricultural population was recorded at 0.9% (Dethier and Effenberger, 2011). This indicative and ineffective consequence of inadequate allocation of budgetary resources to agricultural sector leads the sector to lag behind that of its Asian peers. This is also as a result of disaggregated per capita growth of the agricultural population. Effective measure of performance, planning and budgeting requires adequate information on per capita agricultural income which can also lead to their implementation.

2.3 Empirical Literature Review

Several cross-country (Kelly and Trish, 1997, Alexious, 2009) and country-specific (Knoop, 1999; Alexiou, 2007; Irm en and Kuehnel, 2008; Hussain et al, 2011 and Dandan, 2011) studies have been carried out across the globe to explore the existing relationship between expenditure and economic growth. However, their data periods, methodologies and findings differ with some studies indicating that expenditure by the government has a negative relationship on economic growth and others positing that government expenditure has a
positive impact on economic growth. The incongruent findings of the studies could be attributed to the short data periods of some of the studies, which must have affected the reliability of the inferences drawn from the studies. The inconsistencies between the methodologies and time series analyses of most of the studies must have also accounted for the variations in the findings of the studies.

Njuguna (2009a) studied government expenditure and economic growth in Kenya for the duration ranging from 1963 to 2006. The study investigated the relationship between levels of real capital expenditure on various sectors such as education, health, agriculture, defense, general administration economic and social services and other expenditures influence economic growth of the country. In investigating the crowding in and out effect of the private sector by government expenditure, the study adopted a simple correlation analysis based on the argument that government expenditure on various programmes does affect private individuals decisions.

Njuguna (2009b) used time-series data for the ASEAN countries from 2000- 2005. The variables used in the study were budget deficits, exchange rate and the balance of current account. The study used the technique of ordinary least squares to investigate how budget deficit, exchange rate and current account position can affect economic growth of a country. The results were that repeated violation of the budget ceilings set by the government leads to increased budget deficit over the period. If a country is incurring huge budget deficits, the public debt increases continuously. The increase in debt has an increase pressure on interest rates leading to financial challenges.

Awuor (2012) carried out a study on the influence of government’s agricultural subsidies on food security in Kasipul division, Homabay County. The descriptive survey design was employed where both qualitative and quantitative information was gathered targeting all the
farmers that benefited under the governments subsidy programme in Kasipul Division. The regression results showed that time of distribution of subsidies, training farmers; access to right information and the quality, quantity and type of inputs were the major influences in the use of government’s agricultural subsidies in enhancing food security in Kasipul Division. Others were dependence on rain fed agriculture, inadequate financing and inadequate agricultural personnel.

Kambua (2014) explored the effects of government expenditures on economic growth in Kenya. The study was descriptive in nature and involved quantitative analysis of the secondary data to analyze the effect of government spending on economic growth in Kenya. Data for economic growth was obtained from World Bank and IMF data bank from 2007 to 2012 where by the data on government spending on health, infrastructure, security and education were converted into calendar years since economic growth obtained were in calendar year. The study findings indicated presence of a significant influence of the government spending on economic growth.

Singh and Weber (2007) did a study on government expenditure and economic growth with specific focus on composition of expenditure. The variables used were infrastructure, justice, defense, education and agriculture expenditure. The study analyzed Swiss time-series data from 2000 to 2004. The estimation technique used by the research was polynomial distributed lag model. The study found that outlays for transport, infrastructure, justice and defense were growth enhancing. Agricultural expenditure as a whole needed further examination, and education expenditure evidence was mixed. This was because of complex relationship between education expenditure and economic growth. The results emphasized that the composition of government expenditure was crucial for the economic growth. The weakness
of that study is that due to short period, the estimation technique used may lead to a considerable loss of the degrees of freedom.

Easterly and Robelo (2003) investigated advanced countries and less developed countries (100 countries) during the periods of between 2000 and 2008. The authors explored empirically the relationship on fiscal policy and economic growth. The following factors were explored: investment, surplus, consumption and other types of government expenditure and taxes and human capital. The study findings revealed that government investment and government consumption had a negative relationship with economic growth; however, there was a positive impact on private investment as well as expenditures on infrastructure had a positive influence on private investment.

2.4 Overview of the Literature Review

Based on theoretical literature and empirical literatures, it is clear that budgetary allocations to different sectors have some effects on the respective sectors. The literature reviewed overly provided evidence that government expenditures on physical infrastructure, education and health care are growth enhancing, (Easterly and Robelo (2003; Singh and Weber, 2007; Njuguna, 2009a and Awuor, 2012). Also some evidence has been found that expenditure typically not characterized as productive such as certain kinds of social benefits and justice and defense could as well be conducive to economic growth (Singh and Weber, 2007).

Some studies like (Knoop, 1999; Alexiou, 2007; Irmen and Kuehnel, 2008; Hussain, et al., 2011; Dandan, 2011, and Kambua, 2014) were more of country-specific challenging inferences to other countries. This meant that their general conclusions could not be useful for policy decision in individual countries because of diversity of their experiences and
policies taken. From the literature, analyses were arrived at through descriptive and correlation analysis (Njuguna, 2009a) while others studies adopted different models in estimation including polynomial regression, Ordinary least square (OLS) among others (Njuguna, 2009b). This study shall employ ordinary least square method as an estimation technique (OLS) in order to estimate and establish significance of the budgetary allocations to agricultural sector on agricultural growth. Unlike (Singh and Weber, 2007) who used a short period (2000-2004) to establish the relationship between government investment and economic growth, this study employs a longer period (1982-2014). Other factors like population growth rate, political cycles and technological factors as moderating factors. The study shall also conduct various diagnostic tests (pre-estimation and post estimation test) to validate the model and avoid spurious regression and reduce bias.
CHAPTER THREE
METHODOLOGY

3.1 Introduction
This chapter describes the methodology that will be used in undertaking the study. The section examines the analytical framework, model specification, variable definition, data sources and estimation issues.

3.2 Analytical Model and Model Specification
Budgetary allocations and other forms of agricultural credits such as insurance provisions from the government can lead to expansion of the possibility of processes, investment, research and general productivity of agricultural sector (Ozor et al, 2007; Ibitoye, 2012). Based on Musgrave- Rostow’s Theory, the regression equations shall be as indicated below:

$$\text{APR}_t = f(\text{API}_t, \text{ABAL}_t, W_t, \text{IPI}_t)$$ (1)

Where,

$\text{APR}_t = \text{Agricultural output}$

$\text{API}_t = \text{Agricultural Price Index}$

$\text{ABAL}_t = \text{Agricultural Budgetary Allocation}$

$W_t = \text{Weather Variable}$

$\text{IPI}_t = \text{Input Price Index}$

From equation 1 above, the study shall consider regression analysis of time series. A regression analysis is a collective name for the techniques used in modeling and analyzing numerical data consisting of values of dependent variable and independent variable (Hair et al, 2006). The Multivariate regression which shall be employed in this study combines all the independent variables and detects the effect of those variables on agricultural growth rate. The study shall extend the model in Equation 1 above to estimate the effect of budgetary
allocation to agricultural sector on agricultural growth rate by considering more moderating factors to avoid bias follows;

\[ Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i \] (2)

Where; \( Y \) = Agricultural Growth Rate for time \( t \)

\( \beta_0 = \) Intercept Coefficient.

\( X_1 = \) Budgetary Allocation to Agricultural Sector

\( X_2 = \) Agricultural Price Index

\( X_3 = \) Population Growth Rate

\( X_4 = \) Weather Variable

\( X_5 = \) Input Price Index

\( X_5 = \) Political Cycles

\( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \), and \( \beta_6, \) = regression coefficients subject to estimation

\( \varepsilon_i \) = error term

To ensure that the estimated model has Best, Linear, Unbiased Estimates (BLUE) characteristics before it is subjected to interpretations. The respective OLS assumptions will be verified through conducting various tests

3.3. Data Source and Variables Description

3.3.1 Data Source

Secondary data will be used in this study to analyze the effect of government budgetary allocation to the agricultural sector on agricultural growth in Kenya. The time series data relating to expenditures on agriculture in Kenya from 1982 to 2014 will be obtained. This type of data will be obtained from government publications as well as publications of international organizations such as World Bank and International Monetary Fund.
3.3.2 Variable Description

Data for agricultural growth will be obtained from World Bank and IMF data bank from 1982 to 2014 which will be chosen since they indicate the era of new government policies on government expenditure on agriculture; despite being a more time frame, it is also a period many variations were experienced in the Kenya (Kosimbei, 2009). All the data obtained will be cleaned and all the nominal data converted to real data for easy of analysis using STATA.

The time-series data for average agricultural growth will be transformed from the nominal values to its real values by dividing nominal values with the appropriate agricultural growth deflator (Wawire, 2006). The study will convert nominal average growth to real average growth since the nominal values fail to reflect the exact changes in productivity and the changes in income as a result of inflation that causes prices to rise when the quantities fall.

The study shall consider growth rates for the population since they provide labour and are directly involved in agricultural activities and thus growth. Political cycles shall be determined for periods when political activity or event was recorded. The dummy variable shall be used in this case. This will be similar to presence of good or bad weather conditions.

3.4 Diagnostic Tests

The Ordinary Least Square (OLS) method makes various assumptions on Normal distribution of the random error term, constant variance of error terms across observations, linearity, no serial autocorrelation of the error terms, no perfect correlation between any pair of independent variables and stationarity. Therefore, diagnostic tests are undertaken so as to validate the estimates that OLS yields.
3.4.1 Heteroscedasticity

Heteroscedasticity affects the minimum variance which later leads to invalid conclusions when testing hypothesis. The residual plot method is used to test for it. If the plots exhibit a systematic pattern, it implies that heteroscedasticity is present. As a remedy, robust standard errors are used (Mukras, 1993).

3.4.2 Autocorrelation

This refers to the correlation between random error terms of the subsequent time periods. If present, the bias leads to spurious estimates. The use of robust standard errors shall serves as a remedy for autocorrelation. The only problem is that variance obtained will not be the minimum and therefore the conclusion made when testing hypothesis will be erroneous (Mukras, 1993).

3.4.3 Multicollinearity

Multicollinearity makes the coefficient of regression to be indeterminate and standard errors become infinite. To check for the presence of Multicollinearity, we will use Variance Inflation Factor (VIF) test which measures how much variance of an estimated coefficient increases due to collinearity. For VIF values greater than 10 and 1/VIF values less than 0.10, will imply that Multicollinearity is present. As a remedy, one of the correlated variables will be dropped or retained if it is not highly correlated, (Mukras, 1993).

3.4.4 Normality assumption of the random variable

The error term need to be normally distributed with zero mean and a constant variance. This is among the classical assumptions of linear regression model. The error term is used to capture all other variables that influence agricultural growth rate but are not included in the
model. For OLS to be applied the study must satisfy the assumptions of normality of the error term (Mukras, 1993), the study will employ Shapiro Wilk test, to confirm whether the error term is normal or not.

3.4.6 Stationarity Test
The study shall conduct unit root tests to detect non stationarity in all the variables. If variables are non- stationary, there is a tendency of the estimates to change over time. This characteristic leads to spurious estimates. Therefore, if variables are found to be non- stationary, successful lagging is applied until the bias is eliminated. The null hypothesis in this case is that the variable under consideration is non-stationary (Gujarati, 2004).

3.4.7 Cointegration
In reality, there is high likelihood that the long-run relationship between the underlying economic variables changes. The reason for this might be as a result of technological progress, economic crises, changes in the people’s preferences and behavior accordingly; policy alteration and organizational or institutional developments that might have taken place. There is a need therefore to have a long-run relationship between the agricultural growth rate and explanatory variables apart from non stationarity. In the absence of cointegration, the estimates would be spurious. The Engle- Granger test will be employed to this effect. Here, the residuals are generated and then the first differences, lagged values and lagged values of the first differences are included in another subsequent regression as regressors. If it is found that there is cointegration and non stationarity but upon first differencing they will be stationary, we shall conduct error correction model (Gujarati, 2004).
CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter covers data analysis and discussion of the results. It gives the summary descriptive statistics of all the model variables. In addition, the chapter covers the correlational matrix that gives the relationship among the variables, unit root test results to determine the order of integration for variables, test for autocorrelation, heteroscedasticity and lastly the regression results for the model.

4.2 Descriptive statistics

The descriptive statistics for the variables are presented in Table 4.1. This comprises of the mean values, minimum and maximum values, variance and standard deviation values, skewness and kurtosis values of the variables.

<table>
<thead>
<tr>
<th>Table 4.1: Descriptive statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Variance</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
<tr>
<td>Observations</td>
</tr>
</tbody>
</table>

Source: Own computation based on analyzed data.
From the descriptive statistics of the study variables, it was shown that agricultural productivity was 29.91% on average over the entire period of study while the least period was reported to be 23.16% with the highest being 34.22%. Further, Agricultural Price Index (API) had the highest mean value of 84.92 with weather variable having the least mean value of 0.2621 metric tonnes of carbon emission per capita annually. On the measures of dispersion as evidenced by standard deviation, Input Price Index (IPI) has the largest dispersion from their mean value, with weather variable having the least deviation from their mean value. Looking at the distribution parameters, we find that all the variables except agricultural productivity are positively skewed meaning that they are skewed to the right. On kurtosis values we conclude that all variables have non–normal distribution with only the agricultural productivity and budgetary allocation normally distributed given that their kurtosis values are close to 3.0. The graphical evidence on the distribution of variables is presented in Figure 1 below.
Figure 4.1 Normality distributions of variables
4.3 Correlational Analysis

In order to understand the correlation among the variables of the model, a correlation analysis was carried out to compute the correlation coefficient. The results for the correlation matrix are presented in table 4.2 below.

Table 4.2: Correlational matrix

<table>
<thead>
<tr>
<th></th>
<th>APR</th>
<th>API</th>
<th>PGR</th>
<th>ABAL</th>
<th>IPI</th>
<th>WEATHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>APR</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>API</td>
<td>0.6557</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGR</td>
<td>0.4932</td>
<td>-0.7166</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUDGET</td>
<td>0.1288</td>
<td>-0.0254</td>
<td>0.3942</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPI</td>
<td>-0.6963</td>
<td>0.0925</td>
<td>-0.6971</td>
<td>0.0027</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>WEATHER</td>
<td>-0.0139</td>
<td>0.3442</td>
<td>-0.5836</td>
<td>-0.2880</td>
<td>0.3201</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Source: Own computation based on analyzed data.

From the results, almost half of the variables had a weak correlation among themselves. As such this does not warrant dropping any of them out of the regression equation since none would lead into Multicollinearity problem upon regression of the empirical model.

4.4 Pre-estimation tests

4.4.1 Unit Root tests

Unit root test was essential in determining the order of integration of the variables prior to the empirical model estimations. This is because estimation of the empirical model without prior knowledge on the order of integration of the variables would lead into spurious regression problem. In this case the Dickey – Fuller tests was applied in testing the presence or the absence of unit root among the variables. Prior to testing for the unit roots, we plot the variables. The plot graphs indicate that all the variables are non – stationary and have a trend. This therefore implies that when testing for the unit root, we apply the test taking into account the deterministic trend. The plot graph is given in Figure 2.
Figure 4.2 Plot graphs for all variables
The results for stationarity / unit root tests with a deterministic trend in the variables are presented in table 4.3

**Table 4.3 Unit root test results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>At level</th>
<th>Critical values and p values</th>
<th>At First Difference</th>
<th>Critical values and p values</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-statistics</td>
<td>5%</td>
<td>P value</td>
<td>t-statistics</td>
<td>5%</td>
</tr>
<tr>
<td>AGDP</td>
<td>3.03</td>
<td>-2.980</td>
<td>1.000</td>
<td>-4.101</td>
<td>-2.983</td>
</tr>
<tr>
<td>APR</td>
<td>-0.214</td>
<td>-2.980</td>
<td>0.9368</td>
<td>-7.948</td>
<td>-2.983</td>
</tr>
<tr>
<td>PGR</td>
<td>-2.808</td>
<td>-2.980</td>
<td>0.0571*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BUDGET</td>
<td>-3.746</td>
<td>-2.980</td>
<td>0.0035</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IPI</td>
<td>-0.056</td>
<td>-2.980</td>
<td>0.9629</td>
<td>-6.293</td>
<td>-2.983</td>
</tr>
<tr>
<td>WEATHER</td>
<td>-2.175</td>
<td>-2.980</td>
<td>0.2154</td>
<td>-5.733</td>
<td>-2.983</td>
</tr>
</tbody>
</table>

Source: Own computation based on analyzed data.

*Stationary at 10% significant levels

From the results, we find that at all levels the variables are non – stationary implying that they have unit roots. This is because, the t – statistics is higher than the critical values at one percent, five percent and ten percent significance levels. Therefore this called for the differencing of the variables. Upon differencing and thereafter testing for the unit root, we find that all the variables are now stationary implying that there is no unit root. This leads to the conclusion that the variables have one unit root meaning that they are integrated of order one. This further necessitated test for cointegration.
4.4.2 Cointegration analysis

The study conducted a cointegration analysis to establish existence of either a long run or short run relationship between the agricultural productivity and budgetary allocations and among other independent variables. Having established the stationarity, we generated the residuals and the first differences of the residuals. The first differences, lagged values and lagged values of the first differences are included in another successive regression as model regressors. The null hypothesis of no long run relationship between agricultural productivity and the explanatory variables is tested against the alternative hypothesis of presence of long run relationship. From the results in the Table 4.4, the p-value of 0.000 is less than 0.05 implying that there is cointegration. This means that there is a long run relationship between agricultural productivity and independent variables. It implies that the variables under study move together in the same direction in the long run.

Table 4.4: The Engle-Granger Test

|        | Coef.  | Std. Err.  | t     | P>|t|       | [95% Conf. Interval] |
|--------|--------|------------|-------|-----------|----------------------|
| Uhat   |        |            |       |           |                      |
| L1.    | 0.8865752 | 0.096376   | 9.20  | 0.000     | 0.6888281 1.084322  |
| LD.    | -0.292064 | 0.1797058  | -1.63 | 0.116     | -0.6607898 0.0766618|
| _cons  | 3.136481  | 2.883274   | 1.09  | 0.286     | -2.779508 9.052471 |

Number of obs = 30
F( 2,  27) = 42.41
Prob > F = 0.0000
R-squared = 0.7585
Adj R-squared = 0.7406
Root MSE = 1.0115

Source: Own computation based on analyzed data.

4.5 Regression Analysis

To realize the various laid out objectives of the study, that is identifying the effect of government budgetary allocations on agricultural productivity, an econometric estimation
was conducted after testing for stationarity of the variables and cointegration. The results are as presented in table 4.5 below;

Table 4.5: Regression results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Std. Err.</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAPI</td>
<td>0.0919609**</td>
<td>0.0457517</td>
<td>2.01</td>
<td>0.024</td>
<td>-0.096127 - 0.2800488</td>
</tr>
<tr>
<td>PGR</td>
<td>-0.3186308</td>
<td>0.5293877</td>
<td>-0.60</td>
<td>0.552</td>
<td>-1.406803 - 0.7695412</td>
</tr>
<tr>
<td>ABAL</td>
<td>2.0180745***</td>
<td>0.6286836</td>
<td>3.21</td>
<td>0.003</td>
<td>-0.1567028 - 3.1928518</td>
</tr>
<tr>
<td>DIPI</td>
<td>-0.1753573**</td>
<td>0.0876787</td>
<td>-2.00</td>
<td>0.037</td>
<td>-0.4669301 - 0.1162154</td>
</tr>
<tr>
<td>DWEATHER</td>
<td>-6.319469*</td>
<td>3.3426344</td>
<td>-1.89</td>
<td>0.080</td>
<td>-8.221831 - 20.86077</td>
</tr>
<tr>
<td>Constant</td>
<td>0.9351221</td>
<td>0.5633266</td>
<td>1.66</td>
<td>0.051</td>
<td>-1.956998 - 3.827242</td>
</tr>
</tbody>
</table>

Linear regression

Number of obs = 32
F( 5, 26) = 1.69
Prob > F = 0.0044
R-squared = 0.8111
Root MSE = 1.4771

Source: Own computation based on analyzed data.

***Significance at 1%, **significance at 5%, and * significance at 10% significance levels

Table 4.5 shows that for overall fit of the model, the R-squared statistic and F test were used. The value of R-squared of 0.8111 shows that the model explains about 81.11% of the variation in agricultural productivity, in other words, the explanatory variables explain only 81.11% of the dependent variable. This small proportion is as a result of few variables used in the model. However, the overall p value of 0.0044 which is less than 0.05 significance levels implies that the regression coefficients are not simultaneously equal to zero. This implies that the explanatory variables significantly explain the dependent variable jointly at 5% significant level.
The following is the model fit for discussion based on Table 4.5.

\[
\text{DAPR} = 0.9351 + 0.092 \text{DAPI} + 2.018 \text{ABAL} - 0.1754 \text{DIPI} - 6.3195 \text{DWeather}
\]

Where DAPR is the first difference of agricultural productivity

DAP is the first difference of the agricultural productivity

DAPI is the first difference of the agricultural price index

ABAL is the agricultural budgetary allocation

DIPI is the first difference of the input price index

DWeather is the first difference of the weather

Based on the above model, if other factors are held constant, agricultural productivity increases by 0.9351%. On the other hand, for a unit increase in the first difference of agricultural price index, agricultural productivity increases by 0.0919% holding other factors constant at 5% significance level. Budget share is also shown to have a positive and significance relationship with agricultural productivity such that at 1% significance level a percentage increase in budgetary allocation, agricultural productivity increases by 2.0181% holding other factors constant. The first difference of input price index reduces the agricultural productivity at 5% significance level by 0.1754% holding other factors constant. Finally, at 10% significance level, the study revealed that poor weather patterns through an increase in carbon emissions leads to a decline in the agricultural productivity by 6.3195% holding other factors constant.

4.6 Post estimation tests

The study considered various post estimation issues. This involved testing of the assumptions of the OLS model as proposed in the methodology section.
4.6.1 Normality test

The study applied Shapiro Wilk test to explore the distribution of the residuals. The study revealed that the distribution of the residuals had a p value of more than 5% implying that they were normally distributed. The p value of the overall residuals was found to be 24.33% more than 5% thus complying with normality requirement of the error term as shown in Table 4.6.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>W</th>
<th>V</th>
<th>z</th>
<th>Prob&gt;z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residuals</td>
<td>32</td>
<td>0.95809</td>
<td>1.398</td>
<td>0.696</td>
<td>0.24329</td>
</tr>
</tbody>
</table>

4.6.2 Tests for Multicollinearity

Multicollinearity promotes biasness which arises when one or more pairs of independent variables are perfectly correlated to each other. The presence of Multicollinearity inflates the variance of parameter estimates leading to provision of wrong estimates and signs and thus incorrect conclusions. Table 4.7 indicates absence of Multicollinearity.

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAPI</td>
<td>6.23</td>
<td>0.160527</td>
</tr>
<tr>
<td>DIPI</td>
<td>6.19</td>
<td>0.161540</td>
</tr>
<tr>
<td>PGR</td>
<td>1.21</td>
<td>0.827647</td>
</tr>
<tr>
<td>Budget Share</td>
<td>1.19</td>
<td>0.837187</td>
</tr>
<tr>
<td>D Weather</td>
<td>1.05</td>
<td>0.953345</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>3.17</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own computation based on analyzed data.
4.6.3 Autocorrelation

To test the assumption of non-autocorrelation, the study employed Breusch pagan test for autocorrelation. This is meant to detect whether the error terms relates to any two different observations which are mutually independent. As shown in the study results in Table 4.8, it was found that there was no autocorrelation since the LM test has a p-value of 0.2959 which is more than 0.05.

Table 4.8: Breusch-Godfrey LM test for autocorrelation

<table>
<thead>
<tr>
<th>Lags(p)</th>
<th>chi2</th>
<th>df</th>
<th>Prob &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.093</td>
<td>1</td>
<td>0.2959</td>
</tr>
</tbody>
</table>

**H₀:** No serial correlation

Source: Own computation based on analyzed data.

4.6.4 Heteroscedasticity

This is refers to the constant variance of the error terms across all the observations. We have applied Breusch pagan test for heteroscedasticity where the p value of 2.32% is less than significance level of 5%. The findings as shown in Table 4.9 imply presence of heteroscedasticity. The study applied robust standard errors as a remedy.

Table 4.9: Test for Heteroscedasticity

<table>
<thead>
<tr>
<th>Breusch-Pagan / Cook-Weisberg test for heteroscedasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ho: Constant variance</td>
</tr>
<tr>
<td>Variables: Fitted values of first difference of agricultural productivity</td>
</tr>
<tr>
<td>Chi2(1) = 5.15</td>
</tr>
<tr>
<td>Prob &gt; chi2 = 0.0232</td>
</tr>
</tbody>
</table>

Source: Own computation based on analyzed data.

**H₀:** Homoscedasticity
4.7 Discussion of the Results

The study results indicated significance influence of budgetary allocation on agricultural productivity. This finding concurred with the study result showing presence of a significant influence of the government spending on economic growth by Kambua (2014) and it is also comparable with the finding of Njuguna (2009a) who investigated the relationship between levels of real capital expenditure on agriculture and other expenditures influence on economic growth of the country. Generally, budgetary allocation in the agricultural sector brings the desired effect in other sectors of the economy through relevant linkages.

On agricultural price index, the study showed a positive and significant effect implying as price of agricultural product increases, consequently productivity is triggered. It acts as a motivating factor.

The negative and statistically significant relationship between input price index and agricultural productivity imply that farmers get to afford more inputs necessary to increase productivity. This is in line with the study result of Awuor (2012) who explored the influence of government’s agricultural subsidies on food security and indicated that input subsidies increases agricultural productivity.

Finally weather was shown to reduce agricultural productivity. As weather patterns becomes unfavorable, productivity declines. Theoretically, high agricultural productivity is mainly associated with favorable weather pattern that is good rainfall.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Summary of the study findings

Government budgetary allocations have been shown to make capital available for agricultural production by helping to secure inputs, technology and management leading to growth and development of the sector. Literature indicates these factors as ingredients for promoting accelerated agricultural productivity. However, in Kenya the sector has performed poorly in some years affecting almost all forms of agricultural farming especially crop and livestock, whose growth has declined. Based on these outcomes, the study strove to identify and analyze government budgetary allocation and its effect on agricultural productivity in Kenya since 1982-2014.

Both price and non-price factors influencing agricultural productivity in Kenya such as the weather patterns, input price index and the agricultural budgetary allocation were analyzed. Before and after estimation, various pre-estimation and post estimation tests were conducted as proposed to eliminate bias. The study tested the hypothesis at 1%, 5% and 10% significance levels. From the study results, it was shown that agricultural productivity increased significantly with budgetary allocations and agricultural price index at 5% and 1% significance levels respectively and lowered by input price index and weather conditions at 5% and 10% significance levels respectively.

5.2 Conclusions of the study results

As indicated in the literature, a large share of economic growth is as a result of contributions from agricultural sector which is either directly and indirectly. To maintain and continue witnessing the sector’s vitality in terms of the generated tax revenues and foreign exchanges,
there is need to consider policies on agricultural price index, budgetary allocations, input price index, and weather patterns.

5.3 Policy Recommendations

Like many other sub-Saharan countries, Kenyan economy has been witnessing fluctuations in performance of the agricultural sector over the last two decades. This slowdown was attributed to poor performance of other sub-sectors such as Maize, Tea among others. However, the impressive performance of the sector which was experienced in 2005 and 2006 may not be maintained or surpassed if the government fails to consider increasing budgetary allocation to trigger productivity since the relationship was established to be significant and positive. This allocation will also have a positive impact on the other complementing sectors.

Since the growth of the national economy in Kenya is highly connected to agricultural growth and development, the government and relevant stakeholders need to control the macro-economic environment such as inflation, exchange rate among others to maintain the agricultural price index which in turn will motivate farmers to increase overall output. Similarly, the negative relationship exhibited by input price index to agricultural productivity should be reversed. There is need for introduction of subsidies to farmers especially on inputs such as fertilizers and high yield seeds. The meteorological department also need to keep farmers updated on the weather conditions to enable them get prepared in advance. Through the Ministry of Agriculture, farmers should be educated on the modern methods of farming to counter bad weather conditions in order to improve agricultural productivity. Lastly, the government should consider a compatible and integrated policy regarding the enhanced support for the agricultural sector to enable the agriculture sector to perform well.
5.4 Limitations of the study

The study focused on the impact of government budgetary allocation on the agricultural productivity of the country for the period 1982-2014. Data and reliability was a major limitation for the study. Lack of data resulted in collection of data from various sources. This may sometimes result in some inconsistencies given different data compilation techniques. Another limitation of the study was the failure to break down the budgetary allocation on agricultural sector into research, extension services and administration costs. The study was nevertheless very informative and identified a number of issues that are of concern.

5.5 Areas for further Research

The limitations of this study necessitate improved research that takes care of the weakness identified. With reliable data on weather patterns, technological improvement, disaggregated budgetary allocation to the agricultural sector, such a study would have more reliable findings. A research analyzing the impact of budgetary allocation on agricultural productivity among different sub-sectors of agriculture can also pursued so as to determine the investment options in the sector as well as the economy. This study can give direction on agricultural enterprises that can be promoted and which can give high returns. Finally, further study need to be conducted on influence of budgetary allocation on agricultural productivity in East African Countries.
REFERENCES


### APPENDIX 1: DATA USED

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