THE IMPACT OF AGRICULTURAL EXPENDITURE ON ECONOMIC GROWTH IN SUB SAHARAN AFRICAN COUNTRIES (SSA)

By

WEOLEBO, Tizita Feleke

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Committee in charge:

Professor Man CHO, Supervisor _____

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Abstract

This study to examine the impact of agricultural expenditure on economic growth of sub Saharan Africa region. The study used secondary data source from the World Bank(WB) development indicator for the period between 1990-2015.The study employed OLS regression and Panel Fixed effect model. The findings revealed that expenditure on agriculture, health and education has a positive and significant effect on GDP per capital of the region.

Public spending on agriculture was strong in promoting economic growth in SSA. Because agriculture is a primary economic base for many African countries. Hence, the study recommended that the government should increase expenditure on agriculture, health and education to promote economic growth. Thus, the results suggest that the allocation of government expenditure towards agricultural sector should be favored in order to enhance sustainable economic growth.

Keywords: Public Expenditure, Economic Growth, Fixed Effect

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I would like to Thank Almighty GOD in the name of Jesus Christ he has done in my life. Then I would like to thank my advisor Cho Man (PhD) for his valuable comments and suggestions. And also I would like thanks to my family and friends for their support and encouragement.

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List of Acronyms

SSA Sub-Saharan Africa Countries

CEA Capital Expenditure of Agriculture

CHE Capital Expenditure of Health

CEE Capital Expenditure of Education

AFDB Africa Development Bank

GDPC Gross Domestic Product per Capital

FE Fixed Effect

OLS Ordinary Least Square

Chapter One: Introduction

1.1. Background

Over the past two decades, Africa has achieved impressive economic growth. The continent average annual growth rate of the real output increased from 1.8 % in the period of 1980–1989 to 2.6% in 1990-2000 and 5.3% in the period of 2000-2014. From the average growth rate Sub Sahara Africa (SSA) has a significant share. It achieved an average real GDP growth (2000-2014) 4.6% per annum (AFDB, 2014).

Agriculture is the most important sector of SSA economy. The region has great potential for agricultural development with total land area of 31 million square kilometers of 65% is estimated to be arable (Rates, 2003). Agriculture is a pillar of the economy, producing employment for most of the regions' population and is the main income generating sector for the majority of the rural population, accounting for more than 30% of the total GDP of the region. It also serves the main source of food and generates 90% of foreign exchange earnings. It provides raw materials for more than 70% of the regions industry with in agriculture (World Bank, 2007). More than 75% of the Sub Saharan African countries population, which residues in the rural area, is engaged in agriculture production as a major means of livelihood (World Bank, 2006). It follows that in developing countries like SSA, spending to agriculture is one of the most important government instruments for promoting economic growth and alleviating poverty in rural areas (Fan & Saurkar, 2006).

However, public expenditure is the main instrument used by governments especially in developing countries to promote economic growth. The government provide basic services

like infrastructure, health, housing, education and food security for the people (Loto, 2012). Therefore, increasing spending for economic sector is necessary to bring economic growth of the country. But public expenditure in agriculture and other sector has been a debatable issue and drawing the attention of researchers and policy makers owing to its impact on the economic growth (Sunday & Elizabeth, 2012). Some empirical studies tries to see the relationship between government spending and economic growth. A study by Loto (2011) found that agricultural spending had insignificant effect on economic growth. In the contrary on this, the same year study by Dimiti pointed out that agricultural spending had a significant positive effect on economic growth. He recommended that raise spending for this sector to increase the output growth. However, the studies on impact of agricultural spending on economic growth came up with different conclusions.

1.2. Statement of the problem

Government expenditure is the main instrument for economic growth of developing countries. However, the growth of an economy depends on the size, spending capacity, and effective use of capital expenditure in the development process (Sharma, 2012). There has been many researches attempts to examine the impacts of government expenditure on economic growth. However, two controversial issues were arise regarding to its role in promoting growth. Some scholars argue that increasing government expenditure promote economic growth. However, some scholar doesn't support the argument. The first argument is that government spending in agriculture is positive impact on economic growth as it creates rural jobs and increased wages(Asare and Essegbey 2016; IFPRI, 2013). On the other hand, study by Loto (2011) found that expenditure on agriculture was negatively related to economic growth.

The study by Ditimi (2011)confirm that agricultural expenditure had a significant effect on economic growth and expenditure on other sectors had insignificant effect. On the opposite, Saad. and Kakalech (2009) indicated that in the long run spending on education are positively significant and spending on defense shows a negative relationship with economic growth. However, spending on agriculture had not significant effect. However, most of the studies come up with deferent conclusions. This paper examined the impacts of agricultural public spending on economic growth of sub-Saharan African countries.

1.3. Objective of the Study

To assess the impacts of agricultural spending on economic growth of Sub-Saharan Africa country the period from 1990 to 2015.

1.4. Research Questions

- Does agricultural spending has impacts on economic growth of SSA?
- What kind of impacts does agricultural spending have on economic growth of SSA?

1.5. Hypothesis of the study

To answer the above raised questions, this paper suggests the following hypothesis:-

Some empirical literature argued that government expenditure has a positive relation with economic growth. Especially, expenditure on pro poor sectors like agriculture, health and education sectors are promote economic growth. For most developing countries, agriculture sector is the main economic sector. It has a lion share of GDP and employment contribution. Hence, there will be positive and significant relationship between public expenditure and economic growth of sub-Saharan African countries.

1.6. Significance of the study

The study analyzes the impact of agricultural expenditure on economic growth.In addition to this the study also examine the impact of education and health expenditure on economic gowth of subsaharan African countries.Thus, the study providing empirical evidence specifically on impact of public expenditure components including agriculture, education and health sectors on economic growth in SSA.

From this analysis, reasonable high policy recommendation can be implemented for SSA region. This research would prove to be useful for appropriate budget allocation for agriculture, education and health sector to enhance ecconomic growth.

1.7. Motivation of the study

Examining the impact of agricultural and other sectoral spending on economic growth outcomes are the motivation of this paper.The data inadvance shows that agricultural spending trends of 21 sub-Saharan African countries fluctuates among the countries during the study period. The effect of other components of government expenditure (education and health) will also be analyzed.

1.8. Organization of the paper

Five chapters are included in this paper. The first chapter has background of the study, statement of the problem, objectives and significance of the study. Chapter two comprised empirical and theoretical literature review. Chapter three presents the methodology used in the study. In Chapter four has findings and Chapter five conclusions and recommendations of the study.

Chapter 2: Literature Review

2.1. Theoretical Literature

Government expenditure is one of the crucial factors that find the level of economic growth of a country. However, Basudev (2012) confirmed the growth of economy depends on the size, spending capacity, Composition and effective use of public expenditure in the economic growth process. Although the quality of public expenditure matters, increasing large amount of expenditure by the government may not necessarily create a successful result in economic growth. Such expenditure should be provided with the right public expenditure management and control in order to achieve economic growth and improve the standard of living of the population (Leonardo, 2011).

Public expenditure represents one of the most important components of the fiscal policy instruments for achieving various goals of governments. One of the aims of government is economic growth. It is expected when public expenditure used for investment in capital asset at the early stages of economic growth.

Theoretical literature on public spending have different views. According to Keynesian, increase in public spending on socio-economic and physical structures is important and encourages economic growth. Maynard Keynes argued in favors of the role of public expenditure in determining levels of income and distribution in the economy. Since then government expenditure has shown an increasing trend. Both the level and composition of government

expenditure are important determinants of economic growth (Chilonda, Musaba, & Matchaya, 2013).

According to the Keynesian macroeconomic thought, public spending can contribute positively to economic growth. Thus, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. As a result, government spending augments the aggregate demand, which provokes an increased output depending on expenditure multipliers. The opponents of this approach stipulate that government consumption crowds out private investment, hampers economic growth in the short run and diminishes capital accumulation in the long run (Diamond, 1989).

On the other hand, Classical economists argue that the increase in public expenditure leads to a deficit that is financed by increased borrowing can increase interest rates, leading to a reduction in private investment. This may shift resources from the productive private sector to public sector which they believe unproductive and hence, crowd out overall performance of the economy.

On the other hand, Classical economists argue that the increase in public expenditure in the economy leads to crowd out effect. It results loss of private sector capital formation, with increase in the interest rates, leading to a reduction in private investment.

Theory of public expenditure by Wagner is related to government's economy and public spending. His states that "The law of increasing government activity". It proposes that during the process of economic development the share of public spending in national income tends to expand (Wagner, 1983). On the one hand Peacock and Wiseman conducted a new study based on Wagner's Law of "increasing state activity" and they found out that Wagner's Law is still

valid. This theory dealing with growth of public expenditure was advanced by Peacock and Wiseman in their empirical study of public expenditure in U.K. for the period 1990-1955 they found that, public fiscal activities, in the country have risen step by step to successive new plateaus. In addition to this, they presented the displacement effect which increases taxing and spending activities by the government during periods of war. This kind of changed fiscal situation causes the previous lower tax and expenditure levels to be replaced by new, higher and budgetary levels (Wiseman and Peacock, 1961). Hence, the movement from the older level of expenditure and taxation to the new and higher level is displacement effect (Chilonda et al., 2013).

2.2. Empirical Literature

Bingxin, Shinggen and Anuja (2009) measures the impacts of government spending on economic growth of developing countries by using panel data analysis. The study found that in Africa, government spending specially on human capital were strong in promoting economic growth. In Asia, spending on human capital, agriculture, and education promotes economic growth. In Latin America, government spending components had not any significant impact on economic growth. The study provide several lessons about spending for developing countries. First, numerous type of government expenditure have different impacts on economic growth, indicating to improve efficiency of government spending by reallocating among sectors. Second, government should increase allocating budget for productive sectors and reduce spending for unproductive sectors such as defense. Third, compare to the other regions, Africa should increase spending in agriculture, especially on agricultural research and development. The spending for this sector is important for poverty reduction in the region. Because, most of the people live in rural areas and their economy based on agriculture.

On the contrary, Saad and Kakalech (2009) using VECM model to examining the impact of public expenditure on economic growth. They found that spending on education has positively significant and on defense shows a negative relationship with economic growth. However, spending on agriculture had not significant effect. In the short run, spending on education and health were negative relationship with growth. However, agriculture and defense spending shows statistically insignificant. This result shows that agriculture spending in both cases found to be insignificant on economic growth.

Similarly, study by Loto (2011) examining the impact of public expenditure on ecpnomic growth using OLS regression method. It was found that public expenditure on agriculture was found to be negatively related to economic growth. The impacts of expenditure on health, national security transportation and communication was found positively related to economic growth. However, national security transportation and communication expenditure were positively related to economic growth, the impacts were not statistically significant.

The study by Ditimi (2011) found that expenditure on agriculture had positive and significant influence on economic growth while expenditure on education, health, transport and communication had insignificant influence on economic growth. Hence, he recommended that the government should reverse the decline in budgetary allocation to other sectors in order to provide the sector with the needed revenue which is necessary in influencing aggregate output of the economy. Similar study by Mwafaq (2011) found that government expenditure has positive impact on economic growth of Jordan.

This positive result is well matched with the Keynesians theory. The study also found the interest payment has no influence on economic growth. The result shows public spending increase economic growth of the country.

Tsadiku (2012) by employ econometrics model to examine the relationship between economic growth and public spending (agriculture and human capital) in Ethiopia. The result indicated that spending on education sector has positive effect on growth whereas health and agricultural sector spending have negative insignificant effect on growth which is similar with the study by (Saad and Kakalech, 2009 & Loto, 2011).

A similar study in Kenya by John and Warren (2012) using ordinary least squares method, the study found that expenditure on education was promote economic growth though expenditure on economic affairs, transport and communication were also significant. On the other hand, expenditure on agriculture has negative impact on economic growth while expenditure on health and defense were found to be insignificant to growth. The findings of the agriculture sector negatively related to growth because mainly the sector focused on crop farming rather than mechanized farming.

Moreover, Chilonda et al. (2013) the result showed that expenditure on agriculture and defense has significant positive effect on economic growth in the long run. However, expenditure on education, health, social protection and transportation and communication were negatively related to economic growth, which is an opposite result with (Saad & Kakalech, 2009).On the other hand, Ogundipe and Oluwatobi (2013) attempts to investigate the impacts of government expenditure on growth performance of Nigeria. They found that the impact of public expenditure has negative (except education and health) and insignificant on growth rate.The result of education is opposite with (Loto, 2011).In the long run, the capital expenditure may likely induce significant impact on economic growth. The authors' recommended proper management of capital, recurrent expenditure and development of good institutions is necessary.

The study by Kareem, Bakare, Ademoyewa, Ologunla and Arije (2015) indicated that a negative relationship between the public sector spending on agriculture, agricultural output and economic growth. The result also showed fluctuation trend in agricultural expenditure over the year. The authors' conclude that federal government spending on agriculture has positive effect on economic growth of Nigeria. Hence, the government should be give much emphasis for increasing budget allocation to the agricultural sector. Hence, the proper spending for the sector can improve economic growth. A similar study in Nigeria by Peter E. and Lyndon M. (2015) found that agricultural spending has positive impact on economic growth. The authors' recommended that increase spending on agriculture to improve economic growth. Because, most of the poor people live in rural areas and their source of income based on agriculture. Therefore, the sector can secure food and create job opportunity for the society. In addition, the government should also increase spending for productive sectors which is the same as study by (Bingxin et al., 2009) and control the increase in price, interest and exchange rates in the economy to attract investment.

A similar study in Nigeria by Barisua and Lezaasi (2010) using OLS method of estimation found that in the short run government spending on education had positive and insignificant impact on economic growth while government expenditure on agriculture has a negative and insignificant relationship with GDP. On the other hand, the study found that government sectoral expenditure on health has a positive and highly significant relationship with GDP.

Abu and Abdullahi (2010) using data from the period 1970-to 2008 investigated the effect of government expenditure on economic growth in Nigeria. He discovered that expenditure on education, total recurrent expenditures and total capital have a negative effect on

economic growth. However, rising public spending on health, transport and communication will enhance in economic growth.

Table.1. the table shows summary of empirical literature review

	Author	Title	Findings of the study
1	Bingxin, Shinggen and Anuja (2009)	The impacts of government spending on economic growth of developing countries	Spending promotes economic growth. Africa should increase spending in agriculture
2	Saad and Kakalech (2009)	impact of public expenditure on economic growth	spending on agriculture had not significant effect
3	Loto (2011)	Analyze the relationship between the government components of expenditure and economic growth in Nigeria.	Agriculture was found to be negatively related to economic growth.
4	Ditimi (2011)	analyze the relationship between the government components of expenditure and economic growth in Nigeria	The findings indicated that expenditure on agriculture had a significant influence on economic growth
5	Mwafaq (2011)	Analyze the relationship between the government components of expenditure and economic growth in Jordan.	found government expenditure has positive impact on economic growth of Jordan

6	Tsadiku (2012)	Examine the relationship between economic growth and public spending (agriculture and human capital) in Ethiopia.	agricultural sector spending have negative insignificant effect on growth
7	John and Warren (2012)	Examine the relationship between economic growth and public spending	agriculture sector spending had negatively related to economic growth
9	Kareem, Bakare, Ademoyewa, Ologunla and Arije (2015)	Analyze the relationship between government expenditure and economic growth	Indicated that a negative relationship betw een the public sector spending on agriculture, agricultural output and economic growth.
10	Peter E. and Lyndon M. (2015)	Examine the relationship between government expenditure and economic growth in Nigeria	Found that agricultural spending has positive impact on economic growth.
11	(Chilonda, Musaba, & Matchaya, 2013	impact of public sectoral expenditure on economic growth of Malawi	Agriculture had significant positive effect on economic growth
12	Barisua and Lezaasi (2010)	Government sectoral spending and growth in Nigeria	agricultural sector spending have negative insignificant effect on growth

13	Abu and Abdullahi (2010)	The effect of government expenditure on economic growth in Nigeria	rising public spending on health, transport and communication will enhance in economic growt

The above summary of empirical literature review on government agricultural expenditure had mixed effect on economic growth. Most of the above empirical literature conducted in Nigeria.

Chapter Three: Methodology and Data Source

3.1. Data and Source

The study will use secondary data on a basis of panel for 21 sub-Saharan countries from 1990 up-to 2015. The data was collected for those variables, included in the model, from UNDP, World Bank Reports and IMF publications.

Table 2. **Variables Definition and Description**

Variables	Definition	Source
Y	GDP per capital of country i at time t	UNCTAD/WB
CEA	Government expenditure in agriculture in millions (constant 2005 US $) for country i at time t	UNCTAD/WB
CEH	Government expenditure in Health in millions (constant 2005 US $) for country i at time t	UNCTAD/WB
CEE	Government expenditure in education in millions (constant 2005 US $) for country i at time t	UNCTAD/WB

According to World Bank Development indicator definition:-

GDP per capita (constant 2005 US$)

GDP per capital

- is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

Agricultural expenditure

- is government (public) spending for agricultural sector. The budget comes from the government, external borrowings and grants.

Education expenditure

- is public expenditure for education sector. The budget comes from government (central and local) budgets, external borrowings, and grants.

Health expenditure

- is public expenditure on health sector. It contains government (central and local) budgets, external borrowings, and grants from nongovernmental organizations.

Table 3. **Expected result**

Variables	Expected sign
Y	Positive
CEA	Positive
CEH	Positive
CEE	Positive

3.2. Model specification

The present study is intended to examining public expenditure in agriculture has an impact on the economic growth of the SSA countries. In this context, economic growth is expected to be achieved through public spending especially in agricultural sector .To achieve this objectives, the study moved ahead in the production function framework. Thus, the model expresses GDP per capital as a dependent variable that includes agriculture, health and education sectors.

The growth model is specified as follows:

Y=f (CAE,CHE,CEE)………………………………………………………… (1)

Where, Y denotes the output level (i.e., GDP per capita), CAE denotes capital Agriculture expenditure, and CHE denotes capital Health expenditure and CEE capital Education expenditure.

3.3. Estimation technique

As methods of analysis, this research will use both descriptive and econometric techniques relied on secondary data gathered from different sources solely on selected SSA‘s economies. Accordingly, the performance of agricultural expenditure and other variables included in the regression will descriptively. Panel data models are estimated by pooled ordinary

Least Square (OLS) regression and fixed effect. Considering the extended production function of equation (1), the estimation of pooled OLS regression can be specified as follows:

$$LY_{it} = \beta_0 + L\beta_1 CEA_{it} + L\beta_2 CEH_{it} + L\beta_2 CEE_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where,

Y_{it} *dependent* variable, GDP per capital (i= country and t =time)

$\beta_1\ CEA_{it}$ represents independent variable of capital expenditure of agriculture with coefficient of β ,

$\beta_2\ CEH_{it}$ represents independent variable of capital expenditure of health with coefficient of β ,

$\beta_3 CEE_{it}$ represents independent variable of capital expenditure of Education with coefficient of β and

ε is the error term which is assumed to be white noised and varies over both country and time. However, while using OLS regression, countries' unobservable individual effects are not controlled therefore heterogeneity of the countries under consideration for analysis can influence measurement of the estimated parameters. Therefore, by incorporating unobservable individual effect and conducting Hausman test if there is correlation between countries' individual effects and growth determinants, the most appropriate way of carrying out analysis is using a panel model of fixed effects. Therefore, the panel specification for fixed effect is specified as follows:

$$LY_{it} = \beta_0 + L\beta_1 CEA_{it} + L\beta_2 CEH_{it} + L\beta_2 CEE_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where,

LY_{it} dependent variable, Log form of GDP per capital (i= country and t =time)

$L\beta_1 CEA_{it}$ represents independent variable Log form of capital expenditure of agriculture with coefficient of β;

$L\beta_2 CEH_{it}$ represents independent variable Log form of capital expenditure of health with coefficient of β and

$L\beta_3 CEE_{it}$ represents independent variable Log form of capital expenditure of education with coefficient of β and

ε_{it} is the error term denote unobservable individual effect.

Fixed Effect model is focuses on the relationship between the dependent and independent variables of different countries over time.

3.4. Hausman Specification Test

Hausman (1978) test is used to differentiate which model is appropriate from fixed or random effect. In this study, the test was confirmed to apply the balanced panel fixed effects model.

From the result we can see that p-value is 0.0012, less than 5% significance level. Hence, the null hypothesis is rejected and the fixed effect model is appropriate for the study. Based on the Hausman specification test fixed effect model is appropriate for estimation techniques.

Therefore, for this study the appropriate method is fixed effect model rather that random effect based on Hausman specification test.

Hausman Specification Test

```
. hausman fixed random
```

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lncea	3.135307	.9233067	2.212001	.6074676
k	.0919585	.0964283	-.0044698	.010608

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 13.40
Prob>chi2 = 0.0012

Chapter Four: Results and Discussion

4.1. Descriptive Analysis

In the study analyzed the impacts of agricultural expenditure on economic growth across 21 sub-Saharan African countries. Annual panel data from 1990 – 2015 was used and tested for stationary and Fixed effect (FE) model of estimation was employed. In this chapter, the study result will present starting from descriptive summary statistics of the variables. In this summary statistics, the standard deviation, the mean, maximum and minimum values of observations for the variables under study are given.

The study used Fixed and Random effect to present the result. The reason for using these estimation was to find out the consistency of our results. The study presents the result obtained by regressing the data of agricultural government expenditure on growth for sub Saharan African countries. The result starts from OLS and Fixed effect by testing Huasman specification to identify which model is appropriate.

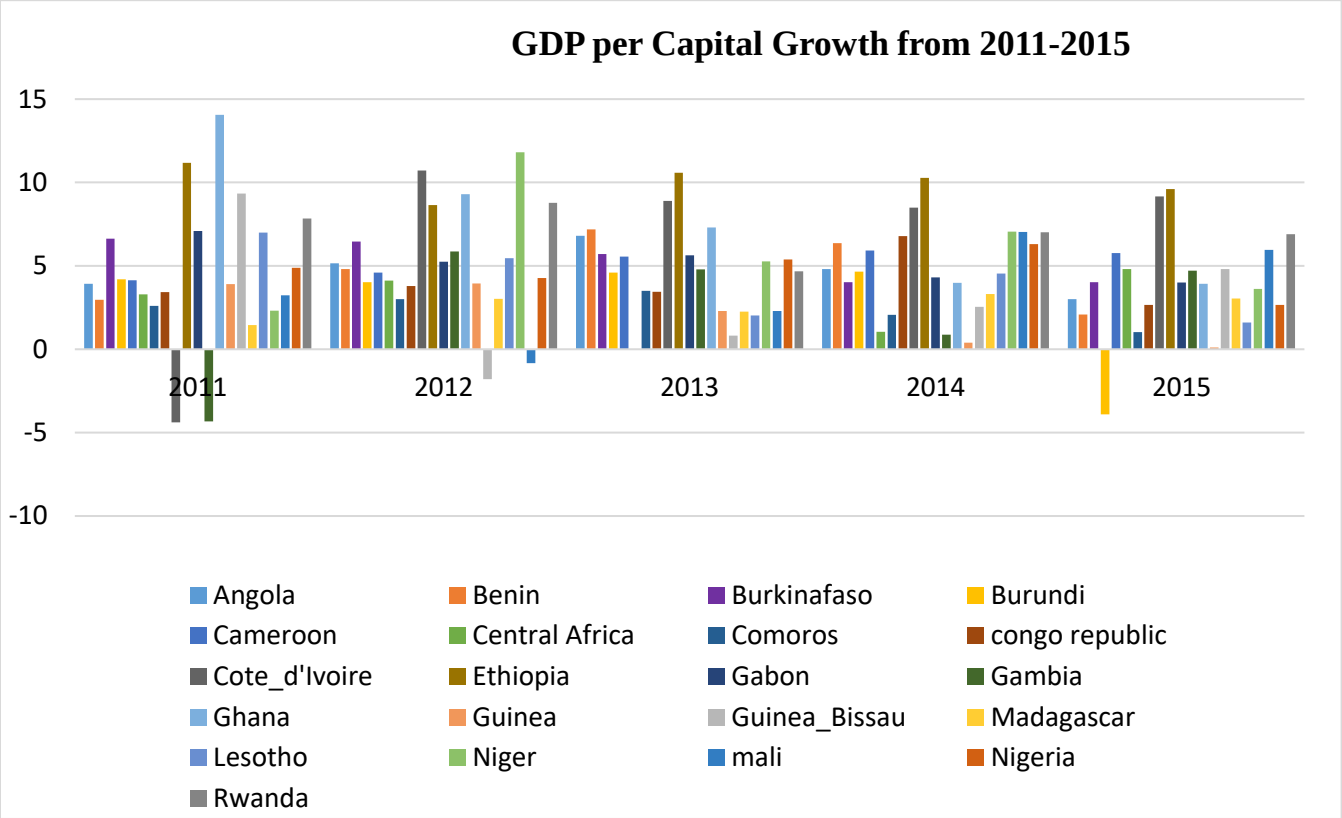
Table 4. Descriptive statistic

Sum LGDPPC LCAE LCEH LCEE

Variables	Std. Dev.	Min	Max	Mean
LGDPPC	.8887849	5.097567	9.386458	6.654052
LCAE	.5036934	1.644187	5.346631	4.067811
LCEH	.5064505	.8124079	3.433644	2.49026

In this summary statistics, we can easily see the total observation, Mean, Standard deviation, Minimum and Maximum for each variable.

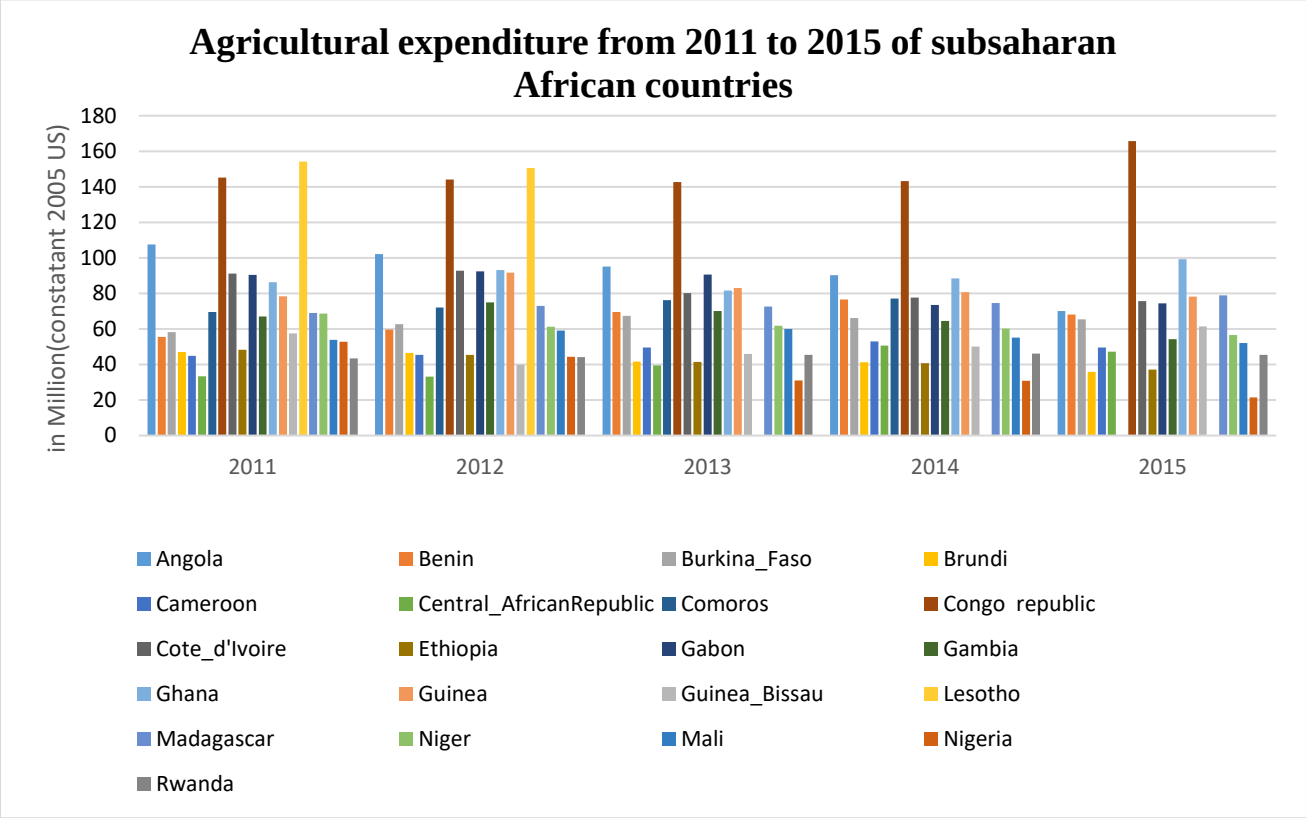
Figure 1. Shows GDP per capital trend of 21 Sub-Saharan African Countries (SSA)



Source: World Bank, 2015

Figure 1 shows the trends of the GDP per capital from 1990 to 2015 of Sub Saharan African countries. It shows fluctuation between the years for all selected countries. In this figure, GDP per capital of Cotedivore, Ethiopia and Rwanda are large among the other SSA countries. Other countries GDP per capital between 4-5 %. Cotedivore and Gambia have the lowest GDP per capital in 2011.Brundi and Guinea have also lowest GDP per capital compare to other countries in 2015.

Figure 2. Shows that Agricultural expenditure of 21 sub-Saharan African countries from 2011 to 2015



Source: World Bank, 2015

The above figure shows that agricultural expenditure trends of 21 sub-Saharan African countries from 2011-2015.Cong republic, Ghana and Madagascar increased agricultural expenditure during the above period. Guinea and Burkina Faso, Guinea Bissau have a slightly increases the expenditure. Angola, Brundi, Rwanda, Mali, Gabon, Gambia, Ethiopia and Niger slightly decreases and increases in the period. Cameroon, Central Africa, Benin, Comoros are their expenditure for the sector fluctuates with in the year. Nigeria is the lowest agricultural expenditure compare to other countries during the period.

4.3. Regression Result

Table 5: **Fixed Effect Estimation**

```
. xtreg LGDPPC LCAE LCEH LCEE, fe

Fixed-effects (within) regression               Number of obs      =       463
Group variable: id                              Number of groups   =        21

R-sq:                                           Obs per group:
     within  = 0.1157                                         min =        14
     between = 0.0661                                         avg =      22.0
     overall = 0.0453                                         max =        26

                                                F(3,439)           =     19.15
corr(u_i, Xb)  = 0.1273                         Prob > F           =    0.0000
```

LGDPPC	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LCAE	.0715355	.0337775	2.12	0.035	.0051498	.1379211
LCEH	.0789894	.0190243	4.15	0.000	.0415993	.1163794
LCEE	.097545	.0143187	6.81	0.000	.0694032	.1256868
_cons	5.871414	.1522096	38.57	0.000	5.572263	6.170564
sigma_u	.88383305					
sigma_e	.15116558					
rho	.97157874	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(20, 439) = 464.85                     Prob > F = 0.0000
```

Based on Fixed effect the coefficient showed that expenditure on agriculture has positively significant to economic growth. Similarly, gross capital formation found to have positive and significant effect on per capita gross domestic product. It indicated that one percent change in agricultural expenditure results in a 0.071 percent increases in per capital GDP of sub-Saharan African countries. This implies agricultural expenditure enhance economic growth of the countries, while 1% increase in Capital expenditure on health results in .078 percent increase in GDP per capital and the same result for capital expenditure on education results in .097 increase in GDP per capital of the region.

The result indicated that capital agricultural, health and education have positive and significant effect on economic growth of sub-Saharan African countries.

Table 6. **GDP per capital and Agriculture, Health and Education Expenditure**

	(1) OLS	(2) OLS	(3) FE	(4) FE
Variables	LGDPPC	LGDPPC	LGDPPC	LGDPPC
LCAE	1.00***	1.08***	0.13***	0.07**
	(0.06)	(0.07)	(0.03)	(0.03)
LCEH		-0.13		0.08***
		(0.07)		(0.02)
LCEE		-0.12**		0.10***
		(0.05)		(0.01)
_cons	2.58***	2.90***	6.14***	5.87***
	(0.26)	(0.38)	(0.11)	(0.15)
N	546	463	546	463
R-sq	0.323	0.355	0.043	0.116
Standard errors in parentheses				
**** p<0.05**	* p<0.01	*** p<0.001"		

Source: STATA

The above table first column (OLS 1) shows that GDP per capital and agricultural expenditure has positive and statically significance. The second column (OLS 2) shows that expenditure on health and education also has negatively related to GDP per capital. In the same table column 3 and 4 (Fixed effect 3 & 4) shows that agricultural expenditure has positive effect on economic growth of sub-Saharan African countries and expenditure on education and health also has positive related to economic growth of the region.

The results revealed that there were positive and significant relationship between government agricultural spending and economic growth.

The study used Ordinary Least Square and fixed effect revealed that agricultural government expenditure on economic growth is consistently positive for all the estimation techniques.

For this study fixed effect model is appropriate according to Hausman specification test and the study expected to find positive and significant effect on growth. From the regression results the coefficient of agriculture expenditure is positive and statistically significant as expected. The positive effect of expenditure on agriculture is consistent with a prior expectation, given the immense contribution of the agricultural sector to economic growth in Sub Saharan Africa.

This study consistent with the previous findings by Ditimi (2011), Bingxin, Shinggen and Anuja (2009), Mwafaq (2011), Chilonda et al. (2013) and Peter E. etal. (2015), which found expenditure on agriculture had positive and a significant influence on economic growth. They recommended that government should increase spending of the sector to improve economic growth of the countries. The positive relationship between public expenditure and economic growth supports Keynesian theory which is increase in public spending on socio-economic is important and encourages economic growth.

While other authors also found opposite result to this study the agricultural spending had negative and insignificant to economic growth of the countries. Because of lack subsequent investment to the sector. It leads poor performance of agricultural sector and low level of government spending to infrastructures.

Chapter Five: Conclusion and Recommendation

5.1. Conclusion

The main objective of the study was to examine the impact of agricultural expenditure on economic growth of 21 sub-Saharan African countries from 1990 to 2015. A review of the relevant expenditure theory and literature to the study. Employing OLS (Ordinary Least Square) method and balanced panel fixed effect model. To assess the impacts of agricultural spending on economic growth of Sub-Saharan Africa country. And also includes other sectors (health and education) of the economy. Hence, the growth model is a function of government expenditure (agriculture, health and education).

The findings that expenditure on agriculture sector spending has positive and statistically significant effect on economic growth. This finding is consistent with the findings of Ditimi (2011), Bingxin, Shinggen and Anuja (2009), Mwafaq (2011), Chilonda et al. (2013) and Peter E. etal. (2015). The result in general shows that government sectoral spending on agriculture, education and health contributes positively to growth in line with our prior expectation.

Therefore, the study indicated that increasing expenditure for agricultural sector is enhance economic growth of sub-Saharan African countries. For many developing countries agriculture is base of their economy. Its contribution to GDP and employment is very large. The sector also the main tool to reduce poverty in many developing countries. The majority of the world poor lives in rural areas and are primarily engaged in agriculture. Therefore, agricultural public expenditure is one of the most important government instruments for promoting economic growth and alleviating poverty in the region.

5.2. Policy Recommendation

The study found that public expenditure on agriculture, health and education sector show positive effect on economic growth of sub-Saharan Africa country. Hence government expenditures towards these sectors have to be enhanced.

Based on the findings, the study suggests that First, the government should increase spending on basic sector to enhance economic growth of sub-Saharan African countries. Second, the government should increases the expenditure on research and development of the sector. Third, raises the performance of the sector by giving incentive for farmers and building good institution. Fourth, the government appropriately manages the spending to protect the sector from corruption.

More generally, as the major findings of the study public spending can contribute to growth through investment in education, health and agriculture are believed to be essential mechanisms. The government should appropriately allocate the budget for the sector to enhance economic growth of the region.

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World Bank national accounts data, and OECD National Accounts data files

Appendix A

STATA output Table 4: Agricultural expenditure (sub-Saharan Africa countries) and economic growth

```
. xtreg LGDPPC LCAE LCEH LCEE, fe

Fixed-effects (within) regression               Number of obs      =       463
Group variable: id                              Number of groups   =        21

R-sq:                                           Obs per group:
     within  = 0.1157                                         min =        14
     between = 0.0661                                         avg =      22.0
     overall = 0.0453                                         max =        26

                                                F(3,439)           =     19.15
corr(u_i, Xb)  = 0.1273                         Prob > F           =    0.0000

------------------------------------------------------------------------------
      LGDPPC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        LCAE |   .0715355   .0337775     2.12   0.035     .0051498    .1379211
        LCEH |   .0789894   .0190243     4.15   0.000     .0415993    .1163794
        LCEE |    .097545   .0143187     6.81   0.000     .0694032    .1256868
       _cons |   5.871414   .1522096    38.57   0.000     5.572263    6.170564
-------------+----------------------------------------------------------------
     sigma_u |  .88383305
     sigma_e |  .15116558
         rho |  .97157874   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(20, 439) = 464.85                     Prob > F = 0.0000
```

Appendix B

STATA output Table 5: GDP per capital and Agricultural Expenditure

	(1) OLS	(2) OLS	(3) FE	(4) FE
Variables	LGDPPC	LGDPPC	LGDPPC	LGDPPC
LCAE	1.00***	1.08***	0.13***	0.07**
	(0.06)	(0.07)	(0.03)	(0.03)
LCEH		-0.13		0.08***
		(0.07)		(0.02)
LCEE		-0.12**		0.10***
		(0.05)		(0.01)
_cons	2.58***	2.90***	6.14***	5.87***
	(0.26)	(0.38)	(0.11)	(0.15)
N	546	463	546	463
R-sq	0.323	0.355	0.043	0.116
Standard errors in parentheses				
**** p<0.05**	* p<0.01	*** p<0.001"		