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Impact Of Public Education Spending on Agricultural Productivity in Sub-Sahara Africa.

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Abstract:

In this research, impact of public education spending on agricultural productivity in Sub-Saharan Africa (SSA)was investigated. The study hypothesized that an increase in public spending on education leads to an increase in agricultural productivity. To test the hypothesis, the study utilized panel data from 39 sub-Sahara African countries and the system GMM model was employed to establish the relationship between public spending on education and agricultural productivity. To ensure the robustness of the model, public spending on agriculture and rural population and other variables were incorporated in the model as control variables. The results of the study revealed that there was a positive and significant relationship between public spending on education and agricultural productivity. A positive relationship between public spending on agriculture and agricultural output was established. The conclusions of the study underscore the need for African government to pay close attention to the public education so as to raise the level of agricultural output and economic growth in sub-Sahara Africa.

Key word: Agricultural productivity, public education spending, system GMM, Sub Saharan Africa

Introduction

Sub-Saharan Africa (SSA) is located south of the Sahara Desert on the African continent. Sub-Saharan Africa (SSA) encompasses 46 countries out of the 54 countries located in Africa, however since this region is not standardized, the number of countries in SSA usually range from 46 to 48 depending on the organizations that is describing the region (U. N. D. P. 2019). SSA is further sub divided into four regions namely west Africa which stretches from Senegal to Chad, central Africa stretches from Cameroon to the democratic republic of Congo, East Africa stretching from Sudan to Tanzania and Southern Africa which comes from Angola to south Africa. According to Statista (2020), sub-Saharan Africa ‘s total population was approximately 1.18 billion by the year 2021.

By the year 2050 the region's population is expected to be 2 billion and over the next 30 years, half of the world population is expected to take place in Africa. Sub -Saharan Africa is gifted with the wide range of minerals according to Ahmed and Edwards (2021), copper, limestone, uranium, diamond, gold, bauxite iron and petroleum makes up the dominant eight minerals mined in Africa. These consist of 405 a total mine occupying 85% of the 3,055 km^2 total land area. For the period 2000 and 2018 there has been an expansion of over 58% of new mines created. These expansions are evident in Ghana and the Niger-delta region of Nigeria and the copper-belt of the democratic republic of Congo and Zambia. However, despite the diverse geographical features and the richness in technology, the region still faces a range of climate issues and natural calamities like floods, droughts and other extreme weather conditions like scarcity of water. Economic growth across SSA is unevenly distributed, for example in 2023, West Africa's growth was recorded at 3.3 % whereas that of East Africa was standing at 1.8% below the growth in West Africa. This disparity can be explained by the frequent coups and violent conflicts in the region for example, countries like Gabon, Niger and Burkina Faso experienced coups which led to the lag in their economic growth. Other countries in SSA are persistently faced by challenges such transportation and energy crises that lead to an increase in the cost of production hence reducing on the level of economic growth (Bloom et al. 2014).

Among the various challenges discussed above, the region continuously experiences multiple challenges related to the agricultural sector. The challenges range from inadequate funds, poor quality input, to low labor productivity in the sector. Because of the challenges of low labor productivity in the agricultural sector, this study sought to unravel the impact of pubic spending on agricultural productivity so as to establish whether the nature of education expenditure contributed to the low level of agricultural productivity in the region. Agricultural productivity is a critical determinant of sustainable development and economic growth on a global scale. This is so because agricultural plays a vital role in the food, livelihoods and raw materials for various industries around the world. The central role of agriculture in the development of several countries has attracted numerous debates and policy measures toward improvement and enhancement of agriculture productivity. For example, the 2030 agenda for sustainable development has been put forward to address the issues and set global targets toward increasing agricultural productivity. This is so because the capability of a nation to efficiently utilize its agricultural resources ensures a stable food supply, employment generation poverty alleviation and overall economic prosperity.

Globally, the growing population and development of big cities has escalated the demand for agricultural products. All over the world, agriculture sector faces the difficult task of increasing in agricultural production for food crops if it's to serve the growing world population which is expected to grow to more than 9.7 billion people by 2050 (FAO, 2017). There has been a relatively steady increase in agricultural production all over the world, the years between 2000 and 2021 have seen a 25 percent increase in the global production of primary crops. Meat production has seen a 53 percent increase in production and 58 percent increase has been witnessed in milk production. Since the 2000's, the steady growth of agricultural production has been higher than that of the population. This progress in agricultural productivity has been attributed to the improved farming methods and technologies (FAO 2022).

To meet the increasing demands for food and the changing dietary patterns, there is an increasing desire to improve and understand the determinants of agricultural productivity. In spite of the growing interest to increase agricultural productivity several challenges like climate change, price actuations and resource depletion have impeded the progress. According to Vasi´c et al. (2019), there is A divergence between the interests of the consumers and those of the producers in the agriculture industry. This is so because as the consumers aim at buying at the lowest price possible sellers who are the producer are interested in selling at the highest price possible. Because of this, an instant change in the seasonal crop yields will immediately render the consumers and the buyers of agricultural products vulnerable to high prices and low prices respectively. In Africa, agriculture holds significant importance as it is a main source of employment for the for a significant number of the people in the country. However, the continent is challenged with multifaceted problems that hinder agricultural productivity. The crucial role of agriculture in Africa has motivated several regional policies aimed at tackling the problem of agricultural productivity. Various meetings have been held to address the issues pertaining to the performance within agricultural sector the region. For example, in 2003, the Maputo declaration was signed by many African states, the Maputo declaration recommended that all Africa countries had to investment 10 percent of their budgets in the agricultural sector. Following the Maputo declaration, in 2015 another declaration known as the Malabo declaration was organized to check on the progress of the Maputo declaration. In 2014, more suggestions from the Malabo declaration underscored the central role of the agricultural sector in the development agenda for the African region in the future. It recommended that doubling of agricultural productivity by the year 2025 was one of the ways to combat hunger and

Africa. In Africa, agricultural productivity gains have not kept pace with population growth, leading to concerns about food security. The World Bank reports that while the agricultural sector contributes significantly to Africa's GDP, it has not translated into commensurate improvements in the living standards of the majority (World Bank, 2017). Factors such as land degradation, insufficient access to credit, and inadequate infrastructure compound the challenges faced by African farmers.

Within Africa, Sub-Saharan Africa (SSA) faces a unique set of challenges that further aggravate the issues of agricultural productivity. SSA has got the world's poorest population, majority of whom work in the subsistence sector with little productivity. Because majority of the producers are working under subsistence conditions, production is highly characterized by a high prevalence of smallholder farmers who operate on limited resources. The region is mostly relying on nature for its production which makes it disproportionately affected by climate change, erratic rainfall patterns and extreme weather events. These challenges contribute to the vulnerability of agricultural systems in SSA. The World Bank underscores that despite being home to vast agricultural potential, SSA remains a net importer of food, highlighting the urgency for targeted interventions to enhance productivity in the region (World Bank, 2020). The agricultural sector being one of the dominant sectors in SSA has motivated this study. Basing on the recommendations of the Maputo declaration, the major aim of this study was to ascertain the intricate dynamics within the agricultural sector by investigating the impact of public expenditure on agricultural productivity

Although Iganiga and Unemhilin (2011) acknowledged that there were several factors responsible for agricultural productivity, FAO (2022) revealed that public expenditure was one of the main of sources of investment in the agricultural sector. In spite of this moreno-dodson (2008), have had reservation on government expenditure as a driver of growth, according to them public expenditure may at times adversely affect sectors of the economy like agriculture. Mo (2007) also noted that public expenditure does not contribute to the increase in economic growth of a country. However, authors like Meniago et al. (2013), have highlighted that public expenditure performs a vital part both in the economic growth and economic development among some developing countries. Several studies have addressed the role that public expenditure plays in the economic growth of

the economy, however little attention had been given to analyzing the effect of public expenditure on the specific sectors like the agriculture agricultural sector (Allen et al. 2021).

The agricultural sector in SSA is affected by a range of problems that are specific to the demand and supply features of the region. Unlike other world regions ,the problems facing the agricultural sector in SSA are multifaced, agriculture faces both demand side problems and supply side problems. In spite of the rapid population growth in SSA, the agricultural sector still faces enormous demand problems, this is so because of the low level of purchasing power from the majority of people from the region. The poverty rates in the regions are very high mostly, affecting women who constitute the biggest labor force in the agricultural sector within the region. another problem affecting demand for agricultural commodities is that consumer demand is highly concentrated in urban centers which hinder the income multiplier effects that would promote the growth in demand for the agricultural commodities. SSA farmers concentrate more on crop production and very minimal livestock farming is carried out, this trend further affects the demand for agricultural products because when the rich that demand for agricultural products become more richer, their dietary requirements shift from crop consumption to more meat and milk products which further adversely impacts the demand for the agricultural products. (FAO,2016)

The agricultural sector in SSA is encountering numerous challenges from the supply side. The problems from the supply side are underline by the low level of agricultural productivity with in the region relative to other world regions. The reasons for the low level of agricultural productivity in SSA range from low level of technology to poor land tenure system. However, the low level of agricultural output is highlighted by a strikingly low level of labor productivity compared with other world regions. Most of the increase in agricultural output with the region is underpinned by the large agricultural area, therefore the rise in productivity is attributed to the increased cultivation of a large size of agricultural land. In spite of the advantages provided by a large area, the region still faces of land ownership challenges which are accentuated by a problem of land fragmentation (FAO , 2016). Its upon this background that the study sought to investigate whether public investment in education and agriculture could improve on agricultural productivity

Therefore, this present study addresses this by investigating the effects of public expenditure on education on agricultural productivity in SSA. The case for understanding agricultural sector as an

important topic in Africa is raised by Pfunzo (2017), who urges that growth in agricultural productivity is positively related to economic growth. Pawlak and kołodziejczak (2020) have also reported that the agricultural production is the main contributor to economic growth in most SSA countries. In addition to addressing agriculture as a specific sector of the economy. This present also addressed the methodology gap by employing the panel data and GMM model in analysis, since most studies had utilized times series and other models in studying the relationship between agricultural productivity and public expenditure.

Education in Sub-Saharan Africa

One of the primary objectives of this study was to establish the impact of public expenditure on education on agricultural productivity in SSA, the nature and patterns of education sector ranging from enrollment rates to education financing are discussed below.

Besides the many economic and political challenges facing the region, SSA, is still grappling with the numerous education challenges. Education is considered as the main foundation of the society ‘s socio economic progress education has had a profound positive impact on the socio-economic landscape of societies all over the world as well as sub-Saharan Africa. According to Walter et al (2019), education is a necessary component for any society to free its self from the chains of poverty and inequality. Walter et al (2019) further urges that its basic education that is responsible for an increase in productivity. This is so education manages to reduce on poverty through investing in accessible and quality education. Investment in quality education has significantly contributed to the empowerment of citizens in SSA with knowledge and the ability to engage in more diverse and modern economic undertakings. In spite of the profound contribution that education has had on societies in SSA, the region still grapples with persistent challenges affecting the performance of the education sector. The education sector in SSA perspective is continuously challenged by many problems ranging from the quantity and quality of education services provided to the citizens, in comparison to the other developing world regions. Globally, SSA experiences the highest rates of education exclusion. The high rate of education exclusion is can be explained by the extreme poverty rates that the citizen in SSA face. A considerate number of the children in the region cannot access education because the parents do not have the capacity to raise the school fees, for example in Uganda, more than 40 % of the parents still worry about school fees in spite of the fact that the government is providing free primary education, according to the Unicef report

on education, more than one –fifth of primary age children and more than 60% of the youth between the ages 15 and 17 are not enrolled in school (Unicef, 2019).

The education system in Africa still experiences school enrollment problems , according to UNESCO (2019) , 96% of learners in SSA join primary one , however, this number continues reducing as the learners advance to higher levels, so that towards completion only 67% of learners complete the primary education cycle with less than 19% completing the upper secondary level , i general the gross enrollment ratio in SSA reveals a big disparity with between the preprimary enrollment rates and the tertiary enrollment rates , that's is to say , a 26% gross enrollment ratio at primary and a 5 percent gross enrollment ratio at tertiary level. Studies have revealed that some of the measures of improving student enrollment like building more schools may not work, this is so because the problems with low students enrollment are associated with the lack of trust in education as a solution to societies problems, therefore the solution may come from measures aimed at convincing the populace about the relevance of education as a driver of social change.

Education Financing In Sub-Saharan Africa

Governments are the main sources of financing in sub–Saharan Africa and a significant part of the education financing in sub-Saharan Africa goes toward recurrent expenditures. This is so because of the high rates of poverty among most countries in SSA which renders the private sector incapable of providing education services to communities with no purchasing power. Government education financing is however facing numerous challenges ranging from lack of funds, corruption to misallocation of these resources. According to UNESCO (2016), in the year 2014, over 93.3 children in SSA where out of school in spite of the efforts by most governments in SSA to keep the children in school. Education financing is SSA has also largely depended on foreign aid from donor agencies like the World Bank. However, there is a noticeable decline in the global aid that is forwarded to financing education, for example there was a 15% decline in education foreign aid between the period of 2010 and 2012, 42% decline is also projected for by the year 2030 (Unesco, 2015). Due to the above financing limitation like weak private sectors, lack of government funds and a fall in donor funds, the question of education financing in terms of the sources and mechanism of financing are of profound importance. In summary, there are mainly three forms of education financing in SSA, these are; private financing which involves the household and other philanthropist spending on education, private education spending however highly depends on the

rate of economic growth. The other form is public education financing, this mainly comprises of government spending on education, this is highly dependent on the amount of revenue got through taxation, and lastly foreign aid education financing which largely comprises of donor organizations outside of SSA

A lot of countries all over the world have invested greatly in education for various purposes, however , many countries in SSA chose public investment in education as a driver for social and economic transformation, previous studies have pointed to a significant relationship between education spending and agricultural productivity, this positive relationship is explained through the acquired ability by farmers in the agricultural sector to access the necessary skills for agriculture which is provided through attainment of education, also the adoption and utilization of modern technology like machines relies a lot of the nature and the level of education that is acquired by certain by the agricultural community. However, the benefits accrued from education attainment cannot be harnessed without education financing. Government spending is among the main sources of financing for most world regions, but this particularly true for SSA which largely relies on public financing as the main source of education. This underpins the significant role that public spending on education has on the enhancement of agricultural productivity within SSA

Studies like Reimers and klasen (2013) who studied the effects of schooling on agricultural productivity in developing countries for the period 1961 to 2002. The authors utilized panel data analysis for 90 countries so as to understand the relationship between agricultural productivity and education, the results of the analysis pointed out that there was a positive and significant relationship between the years of schooling and agricultural productivity. Although the authors studied the relationship between education and agricultural productivity, our study took a different direction by highlighting the impact of public spending on education expenditure, te findings of our study highlighted that there existed a positive relationship between public spending on education and agricultural expenditure.

Eric et al (2014) also researched the nature of relationship between education and agricultural productivity. In line with our findings the researchers revealed a positive and significant relationship between level of education and agricultural productivity. Such finds and more motivated our study and underscored the findings of our study

Theoretical Literature

Wagner's Theory

According to Wagner (1876), public expenditure is an endogenous variable that is stimulated by an increase in economic activity, he urged that it was an increase in economic growth that led to a rise in public expenditure. In contrast to Keynes who proposed that an increase in public expenditure caused an increase in economic growth, Wagner (1876) presented evidence that showed that an increase in public expenditure depended on the rate of economic growth. In Wagner's view public expenditure is a consequence of an increase in economic activity, therefore according to Wagner (1876), an increase in national income cannot be a consequence of an increase in public expenditure. Although Wagner (1876) urged that economic growth contributed to the growth in public expenditure, Lencucha et al.(2020), showed that expanding the agricultural sector and increasing of agricultural output required adequate resources in form of government spending through the government's fiscal policy programs .expanding of the government expenditure is vital for boosting economic activities in an economy as its proposed by Keynes (1936). The contribution of public expenditure to economic growth is underscored by the enhancement in aggregate expenditure and creation of new job opportunities (Ernawati et al. 2021). In spite of the various studies like Bathla, S. (2017) that seems to support the Wagner's law, there is a lot of consensus among scholars of the African economy that government expenditure plays a vital role in stimulating growth as it's posited by the Keynesian school of thought (Dynan &Sheiner 2018).

The Keynesian Theory

Keynes (1936) urged that stimulating aggregate demand and economic growth would require huge sums of government expenditure, he suggested these ideas during the great economic depression of 1929. According to Keynes (1936), the economy could only be taken out of a depression through the increase of government expenditure, Keynesian theory suggested that government spending was the primary driver of economic growth in periods of economic recession. Unlike the Wagner's theory that consider public expenditure to be a endogenous variable, Keynes (1936) considered public spending as an exogenous variable responsible for stimulating domestic economic activity. In a study conducted by Babatunde (2018), the results showed supported the Keynesian theory which proposed that government expenditure stimulated the economic activity. Also Selvanathan

et al (2021) indicated that government expenditure could be used as tool to regulate the rate of economic activity in an economy

Empirical Literature Review

Alabi and Abu (2020) analyzed the impact of agricultural public expenditure on agricultural productivity in Nigeria from 1981 to 2014. A Co-integration and error correction model and system of equations approach were used to model agricultural productivity and government expenditure. In their analysis they found out that agricultural public capital expenditure had a positive impact on agricultural productivity which materialized with lag even though the recurrent and total agricultural public expenditure had no significant effect on agricultural productivity. Their research also revealed that agricultural public spending on irrigation had no significant impact on agricultural productivity.

While using the vector autoregressive (VAR) model ngobeni and muchopa, 2022 conducted a study in South Africa that examined the impacts of government expenditure in agriculture, annual average rainfall, consumer price index, food import value, and population on the value of agricultural production in the period between 1983 to 2019 and found out that an increase in government expenditure in agriculture, average annual rainfall, and had a positive effect on agricultural production. In the same study on the consumer price index and food import value variables, it was discovered that theses had a negative impact on agricultural productivity and reduced on the value of agricultural production

Wangusi and Muturi, (2015) conducted a study which examined the impacts of agricultural public spending on agricultural productivity in Kenya. In this study a descriptive research design and a simple regression model was used to investigate to the relationship between of agricultural public spending and agricultural productivity and the results showed that there was a is a positive relationship between agricultural productivity and public spending to the agricultural sector. However, the methodology used in their study was too simplistic and could not fully account for the intricate relationship between public expenditure and agricultural productivity, this study addresses this by employing the panel GMM method to study the relationship across a wide range of countries using panel data

In another study conducted by Ebenezer et al., (2019) on the impact of public spending and agricultural productivity in South Africa using annual time series data from 1983 to 2016, using the auto regressive lag model (ARDL) it was it is shown that government expenditure on agriculture had a positive long run relationship on agricultural productivity. This current study differs with Ebenezer et al., (2019) in that it employs panel data to analyze the impact of public expenditure in sub–Saharan Africa. In doing so this current study fully addresses the methodology gap as well as the context in which the analysis was conducted

Aragie and Balié, (2021) conducted a study on public spending on agricultural productivity and rural commercialization in Ethiopia, the study showed that productivity-enhancing public expenditure on agriculture led to an increase in the output of cash crops which according to the researcher cash crops involved greater intensity of production which promoted the effective utilization of inputs. In the same study, the researchers established that productivity enhancing public expenditure on inputs like fertilizers had no significant impact on the increase in food. Unlike Aragie and Balié, (2021) who focused on only public spending on agriculture, this current study adressed a conceptual gap by introducing in public expenditure on eduaction variable as a new variable in the analysis, hence adressing the conceptual gap

Apata (2021) carried out a study which examined the effect of public spending on agricultural productivity in major agro-ecological regions in Nigeria for the period between 1981 and 2018. Using descriptive statistics and three-stage simultaneous equations, the forms of Public spending which affect agricultural growth such as education, farm feeder roads and health care facilities and their effect on agricultural productivity were also examined. The study exposed that all the variables above variables had a positive impact on agricultural production. There outcomes showed that a 1% increase in all variables led to an increase on agricultural productivity per capita by a value of 0.043, which meant that an increase on 4.3% on the expenditure on variables such as education would lead to 1% increase in agriculture productivity. Whereas Apata (2021) focused on Nigeria, this current study widens the scope by focusing on the all SSA region for the analysis. This current study also covers the methodological study by introducing panel data, differing from Apata (2021) who utilized time series data

Reimers and klasen (2013) studied the effects of schooling on agricultural productivity in developing countries for the period 1961 to 2002. By using panel data analysis from 90 countries, the researchers found out that there was a positive and significant relationship between the years of schooling and agricultural productivity. The study however indicated that the significance of the level of education attainment on agricultural productivity is higher for countries that are technologically advanced. Both reimers and klasen (2013), this current study used panel data, however on the education variable there was a difference in terms of the variables employed, the current study used public expenditure on education as a proxy for studying the impact of education on agricultural productivity unlike this study which studied the effects of schooling on agricultural productivity

Appleton and Balihuta (1996) carried out a study on impact of primary school education on agricultural productivity in Uganda. After conducting a household survey, the findings of the study showed that workers that had gained primary schooling on the farms was associated with an increase in crop production. The study further revealed that education significant increases agricultural productivity if its associated with an increase in physical capital on the farm. The current study addressed the methodological gap found in this study. Appleton and Balihuta (1996) used the survey method , however this current study employed econometric methods of analysis. This current study employed panel data across 39 countries from ssa. Hence this current study addressed a methodological gap

Eric et al (2014) investigated how education had affected agricultural productivity. In their study the researchers examined eight farming districts in Offinso municipality. The researchers utilized 100 respondents from the farming districts. The main objective of their study was to assess the role of different forms of education on agricultural productivity. The study revealed that agricultural productivity increased with the increase in level of education. The study further indicated that agricultural output was highest among farmers that had obtained secondary education. The results of the study however pointed out that extension services had more impact on agricultural productivity than formal education. The study lastly revealed that factors like road transport, access to credit and agricultural inputs complimented education in improving the levels of agricultural productivity. Our current study addressed a methodological gap by introducing econometrics method (panel data analysis) unlike this study which employed simple descriptive statistics

Ferreira, t. (2018) analyzed the impact of education on agricultural productivity among the small-scale farmers in Malawi. The researcher employed free primary education as one of the proxy variables for education, the study aimed at establishing a causal relation between free primary education and agricultural productivity in the poor communities of Malawi. The study showed that there is generally a positive relationship between education and agricultural productivity. The study further highlighted that the positive effects of education on agricultural productivity affects various sub groups differently, for example the study revealed that education did not contribute significantly to children who had lost their parents at a younger age. This study concluded that whereas education had a significant impact on agricultural productivity, its contribution differed depending on the age of parent orphan hood. Our studies addressed a methodological and conceptual gap by introducing in the proxy of public spending on education as the measurement for education and as well applied advanced econometric methods

Das and Sahoo (2012) conducted a study on the influence of farmers education and agricultural productivity in odisha. Das and sahoo (2012) used the cobb-Douglas production function in investigating the relationship between the variables, the findings of the study revealed that there was a positive and significant relationship between farmer's education and agricultural productivity. The study revealed that levels of education reduce rural poverty through agricultural productivity enhancement. Whereas this study used the level of education as there independent variable, the current study adopted public spending on education as a variable and it applied system GMM for the methodology

In a detailed study about the effect of mangers education on agricultural productivity in Ghana among poultry farmers, Larbi-apau and Sarpong(2010) applied a cobb-Douglas production function to establish the relation between the dependent and independent variable. The study indicated that there was a significant and positive relationship between the manager's education and agricultural productivity. The study further revealed that management education increased poultry production through equipping the agricultural managers with the ability to adopt new and alternative technics of production and application of modern technology. The study concluded that higher education had a positive and significant impact on agricultural output which improved the performance of the agricultural sector both domestically and globally. This study was narrow since it focused on poultry farming in Ghana. This current study addressed the gap by analyzing

agricultural productivity in SSA and adopted a panel data analysis hence making the study more broad

Hodjo and Nakelse, (2023). conducted a study investigating whether public spending could predict agricultural productivity. In their study, the authors evaluated the effect of two government-spending measures: agriculture budget share (BS) and research share (RS) of agricultural gross domestic product (GDP) on agriculture total factor productivity growth (TFPG) in Africa. They used a panel fixed-effect estimator to control for the country-specific characteristics in twenty-eight African economies from 1991 to 2012. The findings suggested that a BS of 14% and an RS of 15% are required for a country to double its TFPG in the following eight years. Both this study and the current study employed panel data in there analysis, however in our study we introduced the system GMM as a method of estimation unlike Hodjo and Nakelse, (2023) who employed the fixed effect model for their estimation

Brown et al. (2015) carried out a study into the effects of government spending on the agricultural sector in Nigeria. The primary aim of the study was to establish the impacts of government expenditure, deposit money banks loan and gross capital formation on agricultural production output in Nigeria .For estimation purposes, the study employed two econometric methods: The error correction model and the ordinary least square of multiple regression. The findings of this study established that gross capital production had a positive and statistically significant relationship with agricultural output and a positive but insignificant relationship was established for the deposit money bank loans variable. This study employed the error correction model and time series whereas this our employed GMM model and panel data to study the relationship between public expenditure and agricultural productivity. The study by brown and his colleagues considered gross capital formation and deposit money bank loans as there independent variable, this current studies fills thus gap by employing public spending on agriculture and public spending on education as the independent variables

Manzamasso (2023) conducted a study on the relation between government-spending and agriculture total factor productivity growth in Africa. The research used budget share and research share of agricultural gross domestic product as measure of government spending. The study employed panel data from 28 Africa countries for the period 1991 and 2012.to control for country

specific characteristics, the researcher used panel fixed estimator. The findings of the study showed that there was a marginal impact of 6.77% of research share and 7.21% on the budget share over the period of the study. The results of the study indicated that 14% and 15% of the budget share and research share respectively where required for the country to double its agricultural output. Although this current research uses panel data like Manzamasso (2023), this current research fills a methodological gap by employing GMM model to analyses data for agricultural production in the sub-Saharan African countries

Using the vector error correction model Setshedi and Mosikari (2019) carried out a study to find out the effect of macroeconomic variables on agricultural productivity in South Africa. By using time-series data for the period 1975 to 2016, the results of the study indicated that an increasing in agricultural productivity could be achieved through the increase on the government expenditure on agricultural. The findings further indicated that there was a reduction in agricultural productivity as a result of an increase in consumer price index. The study used time series data for South Africa which differs from the present study which investigated the impact of public expenditure on agricultural productivity in sub–Saharan Africa using panel data

Igwe and Esonwune (2011) explored the determinants of agricultural production in Nigeria for the period 1994 to 2007. The study focused on government expenditure as a key determinant of agricultural productivity in Nigeria to establish the relationship between government expenditure and agricultural productivity. The study used time series data to analyze the impact of government spending on agricultural output. Annual rain fall and total population variables were used as control variables to perform multiple regression analysis and correction analysis. The study showed that there was a positive but insignificant relationship between government expenditure and agricultural productivity. The study also confirmed that there is appositive and significant relationship between total population, annual rainfall and agricultural production

In a similar study carried out by Enu and Attah-Obeng (2013) on the macroeconomic determinants of agricultural production in ghana.by using times series data and cobb-Douglas production function to analyze data, the study investigated the relationship between real GDP per capita , real exchange rate and labour force. The results of the study suggested that real exchange rate and labour force were some of the key determinants of agricultural productivity. The study emphasis

that an increase in the size pf the labour force would results into a significant increase in agricultural. The present study differs from this study by investigating the impact of government expenditure on agricultural productivity in sub-Saharan Africa, therefore the current study differs from this study by focusing on government expenditure as a determinant of agricultural productivity

Kadir and Tunggal (2015) studied the influence of macroeconomic variables on agricultural productivity in Malaysia for the period 1980 to 2014. Time series data and the autoregressive-distributed lag model (ARDL) were used to examine the relationship between the various macroeconomic indicators and agricultural production. The results of the study suggested that an increase in government expenditure led to a significant increase in agricultural productivity, the finds also revealed that other variables like exports, money supply also enhanced agricultural productivity. The research indicated that factors like exchange rate and inflation negatively impacted agricultural. This study employed times series data from Malaysia, the current study covers both the methodological and contextual gap by using panel data from the sub Saharan African countries

Using time series data endaylalu (2019) examined the relationship between government expenditure and economic growth in Ethiopia. The study employed vector error correction and the impulse response function to study the relationship between the two variables. The results of the study suggested that that an increase in government expenditure had a positive and significant impact on economic growth. This study focus on economic growth as the dependent variable while the present study concentrated on studying agricultural productivity as the dependent variable. Methodologically, this study uses times series data differing from the present study which employed panel data across the sub Saharan Africa region

Olubokun et al. (2016) also employed vector error correction to establish the impact of government expenditure on economic growth in Nigeria. The study employed time series data to study the relationship. The study revealed that even though government expenditure had a positive and significant relationship on economic growth in the short run, increased government expenditure had an adverse effect on economic growth in the long run. The study studies economic growth in

general whereas the present study focuses on agriculture as specific sector in an economy and also studies a region rather than a specific country

.Iganiga and Unemhilin (2011) conducted a study on the determinants of agricultural production in Nigeria, the research focused on finding out the impact of federal government agriculture expenditure on the value of agricultural output. To determine the relationship between federal government agricultural expenditure and agricultural productivity, a Cobb Douglas growth model was employed. Other variables in the analysis included consumer price index, population growth rate, commercial credit to agriculture , GDP growth rate and food importation. To find out the long run and short run relationships of these variables on agricultural productivity, error correction and co-integration methodology was used. The study confirmed that federal government agricultural expenditure had a positive relationships with agricultural productivity. The study was conducted for a specific country Nigeria, however the present study considered sub Saharan Africa as the area of study, therefore the present study addressed the contextual gap

Using the data for the period 1970 t0 2008, Udoh (2011) studied the relationship between private investment, government expenditure and agricultural productivity in Nigeria. The study used the vector error correction model (VECM) model to establish the relationship between government expenditure and agricultural productivity. To ensure robustness of the model, other control variables like labour force participation rate, total foreign direct investment and gross fixed capital formation were incorporated. The findings of the study revealed that there was a positive relationship between agricultural productivity and government expenditure in the short run. Unlike the Udoh (2011) this present study introduced public expenditure on education as another variable in the investigation, the current study also employs panel data series from the sub-Saharan Africa region, hence addressing a conceptual, methodological and contextual gap

Lawal (2011) explored the nature of federal government expenditure on agriculture and examined the relationship between federal government agricultural expenditure and agricultural productivity. The researcher used time series for a period 1979 to 2007. Trend analysis and simple linear regression model revealed that federal government expenditure did not follow a regular pattern. The findings of the study also showed that federal government expenditure had a positive significant relationship on agricultural productivity. The study employed a simple linear regression

model which could not capture the intricate dynamics between government spending and agricultural productivity. The present study addressed the methodological gap by using panel GMM model and employed data from the sub-Sahara Africa

Using the ordinary least square (OLS) method and cob-Douglas production function Itodo, *et al* (2012) indicated that there was a positive but insignificant relationship between government expenditure and agricultural productivity. The study had aimed at analyzing the effect of government expenditure on agriculture and agricultural productivity in Nigeria for a period of 1975 to 2010. The findings of this study were influenced by the researcher's methodology choice and context. This present study addressed both the methodological and contextual gap by employing panel data for the analysis and contextually selected the sub Saharan African region

Bathla, S. (2017) examined the relationship between public investment in agriculture and irrigation and agricultural growth in the Indian for a period 1981-81 to 2013-14. Using time series data for seventeen major states, data for capital expenditure and revenue from agriculture and irrigation was used. The results of the study showed that low public capital formation during the nineties adversely affected farmer's investments and agricultural productivity. The finds of the study further revealed that public investment in irrigation had a positive and significant impact on agricultural growth. The findings of the study showed that big states engaged in a lot of government spending on agriculture compared to the small states. The researchers suggested that more support in form of government spending on agriculture should be provided to poorer states to ensure an increase in agricultural productivity. The study focused on the major states in India whereas the present study addressed the problem of agricultural productivity from the sub Saharan African perspective

Focusing on rural poverty and agricultural growth, Roy and Pal (2002), investigated the relationship between public, private investment and agricultural productivity for a period 1965 to 1999 in India. Basing on the financial accounts data, a simultaneous equation model was employed by the researchers. The findings of the study indicated that there is a positive relationship between public investment and agricultural productivity. In addition to this, the study showed that private investment also had a positive and significant relationship with agricultural productivity. The

author's also found out that the impact of investment on agricultural productivity was higher than the impact of subsidies.

Methodology

In this chapter, we start by discussing the nature of data and variables employed in the study. We further estimate the econometric model and finally the interpretation of results, discussion and conclusion is presented

Data source

The study purpose of the study was to investigate the impact of public expenditure and agricultural productivity. The study hypothesized that an increase in public expenditure on agriculture leads to an increase in agricultural productivity. The study further hypothesized that an increase in public expenditure on education leads to an increase in agricultural productivity. To conduct the study, panel data was obtained from 39 SSA countries for a period 2010 t0 2020. To measure agricultural productivity, the value of production data was obtained from FAOSTAT, also the public expenditure on education and agriculture was obtained from the World Bank data and FAOSTAT. Data for the control variables; total rural population (was obtained from the FAOSTAT) and agriculture land use was got from was got from the World Bank data. In summary value of agricultural production was considered as the dependent variable; public spending on agriculture and public spending of education were the main explanatory variables. The study also employed three control variables namely; annual rainfall, total rural population and agricultural land use. The selected 39 SSA countries consisted;Kenya, Liberia, Madagascar, Mali, Mozambique, Mauritania ,Mauritius, Malawi, Namibia, Niger, Rwanda, Senegal, Sierra Leone, Sao Tome and Principe, Eswatini, Chad, Togo, Tanzania , Uganda, South Africa, Zambia, Zimbabwe, Gabon ,Ghana ,Guinea, Gambia, Guinea- Bissau, Angola, Burundi, Benin ,Burkina Faso Botswana, Central African Republic, Cote d'Ivoire Congo, Rep. Comoros, Cabo Verde, Ethiopia,

Empirical model

Agricultural productivity, was the dependent variable, in this study agricultural productivity is defined by the value of production data obtained from FAOSTAT, reflecting the changes in output in the agricultural sector. The explanatory variables was public spending on education and other

like public spending on agriculture were control variables . The study hypothesized that an increase in public in public spending on education increases agricultural productivity

$$Y = f(EDU) \quad (1)$$

The study also incorporated other exogenous conditioning factors that determine agricultural productivity. In this model Z was used as a vector to show other exogenous conditioning factors.

After considering Z equation (1) is expanded to:

$$Y = f(, EDU, Z) \quad (2)$$

From equation (2) , the empirical equation is:

$$Yit = \beta_i + \propto_t + \beta_1 EDUit + \beta_2 AGRIit + \beta_3 Zit + \mu it \quad (3)$$

Where Yit is the agricultural productivity of the ith country (i=1,2,..N) in the tth year(t=1,2,3,…T); $\beta_1 EDUit$ represents public spending in education of the ith country in the tth year and $\beta_2 AGRIit$ represents public spending on education of the tth year in the ith country; β_i is the country intercept and $\propto_t$ represents the time intercept; μit is the error term that is independent and identically distributed; $\beta_1$is the coefficient of public spending on education and β_2 is the coefficient for public spending on agriculture and β_3 is the coefficient of estimation for other exogenous conditioning factors (Zit)

Equation (3) shows that agricultural productivity (Yit) is determined by the changes in public spending on agriculture, the equation also indicates that (Yit) is also induced by changes in public spending on education. Besides this, the equation also illustrates that Zit is a vector for the other exogenous conditioning factors which act as control variables. In this study other control variables; annual rainfall (RN) and total population (POP) were incorporated in to the model to address the biases which are associated with multiple regression models. This study employed dynamic panel modeling. Because of this one or more lags of the dependent variables have to be incorporated on the right hand side of the equation. In this study one lag of the dependent variable is included which changed the interpretation of the right hand variables. By doing this the measure of

persistence in the dependent variable is provided. By introducing the lagged dependent variable and control variables into the model, the dynamic model specification are represented by the equation below

$$Yit = \beta_i + \propto_t + \infty Yi_{t-1} + \beta_1 EDUit + \beta_2 AGRIit + \beta_3 Zit + \beta_4 LLN + \beta_5 POP + \mu it \quad (4)$$

In order to deal with the problem to increase on the accuracy of the model, logarithmic transformations are introduced;

$$LYit = \beta_i + \propto_t + \infty LYi_{t-1} + \beta_1 LEDUit + \beta_2 LAGRIit + \beta_3 Zit + \beta_4 LLN + \beta_5 LPOP + \mu it \quad (5)$$

Where L is the natural log; ∞LYi_{t-1} is the lagged dependent variable for agricultural productivity and ∞ is the coefficient for the lagged dependent variable for agricultural productivity and LLN represents land for agriculture whereas POP represents total population. β_4 is the coefficient for land for agriculture and β_5 is the coefficient for total population

3.4 Methods Of Estimation

The generalized method of moments (GMM) was employed to estimate equation (5). The GMM was selected because it was associated with some characteristics that made it better than the traditional approaches like the random and fixed, and pooled ordinary least squares (Amuakwa-Mensah and Adom, 2017). GMM is dynamic panel estimator used in estimating parameters in statistical modes. It employs instrument that are functions of the model parameters, so that there expectation is zero at the parameter's true value. GMM is better than the tradition approaches in that it controls for the endogeneity of the lagged dependent variable. Endogeneity refers to the circumstance where there is a correlation between explanatory variables and the error term in the model. GMM also more suitable than the fixed effects and random effects approach because it controls for measurement errors omitted variables and unobserved heterogeneity (Hansen, 1982). The GMM approach was also selected due to the specific characteristics of our panel data. The panel we used had the number of cross section (N) greater than the time span T, which made GMM the appropriate approach since it's suitable for data with such features.

There are basically two GMM estimators; the difference GMM and the system GMM. The difference GMM was proposed by Arellano and Bond (1991), the techniques in the difference

GMM serve an important task of correcting for endogeneity by transforming all regresors through differing and removing of fixed effects . The difference GMM has however has some weaknesses in dealing with endogeneity in the first difference transformation in the unbalanced panel data. This is so because it subtracts the previous observation from the contemporaneous one which enhances the gaps in the unbalanced data. To minimize on the weakness of the difference GMM, Roodman (2009) recommends that the systems GMM by Arellano and Bover (1995) and Blundell and Bond (1998) should be used. The systems GMM plays a role of removing endogeneity by introducing more instrument which dramatically improves on the efficiency, it also transforms the instruments thereby making them uncorrelated to the fixed effect. The systems GMM build a system of two equations; the original equation and the transformed equation, also by using orthogonal deviation ,there is reduction in data lose. This and more makes system GMM more suitable for data from SSA which is usually incomplete and characterized with unbalanced data

To select between the difference GMM and systems GMM, Bond (2001) suggests that at first the dynamic model should initially be estimated by pooled OLS and fixed effects, he highlights that the pooled OLS for the lagged dependent variable coefficient should be considered an upper bound estimate while corresponding fixed effects should be considered a lower bound estimate .This method enables us to pick between difference GMM and the system GMM. The system GMM employs the windmeijer- corrected standard error to take care of the problem of heteroscedasticity (Windmeijer, 2005). To ensure the robustness of the model, several diagnostic tests were performed on the system GMM; the Arellano- Bond test (AR (1) and AR (2)) for the first and second auto correction were carried out. Also the Hansen j test was performed, this was meant to take care of the problem of over the validity of instruments and the over identification problem (Labra-Lillo and Torrecillas 2018).

3.5 Empirical Results, Findings And Discussions

3.5.1. Descriptive Statistics

From the descriptive statistics, the values of the standard deviation for Agricultural public expenditure and rural population are larger than the mean values. This variation suggests that the data for agricultural public expenditure and rural population are more spread out. The table below also indicates that the data points for other variables do not deviate far away from the mean. This

is due to the fact the standard deviations for other variables like education public expenditure are lower than the mean.

Table 3.1. Summary Of Statistics Used In The Study

Variable	Mean	Standard deviation	Minimum	Maximum
Value of agricultural production	3.55E+08	2.25E+09	30036.00	1.78E+10
Education public expenditure	4.160995	2.735000	0.691880	44.33398
Agricultural public expenditure	5928.645	11738.51	47.59000	74022.47
Rural population	4060.435	5707.815	10.67000	34296.81
land for agriculture	46.14812	18.91780	7.825291	81.35387

SOURCE: Authors Compilation

Selecting between system GMM and the first difference GMM

To select between the first difference gmm and system GMM, the procedure below was carried out. The results from the estimation are presented in the tables below.

Table 3.2.A table showing fixed effect results

Variable	Coefficient
LY(-1)	1.000534
LEDU	0.015332
LAGR	-0.004075
LPOP	0.010800

LLN	-0.002807
C	-0.036999

Source Authors Compilation

From table 3.2 above the value of lagged dependent variable (LY (-1)) from the fixed effect estimation is 1.000534 at a significance level below 0.05, the results for the first difference GMM in table 1.3 is 0.734740. In order to select between the system GMM and first difference GMM, we compared the coefficient of the lagged value of the dependent variable in for the fixed effect and the first difference GMM. From comparing the results, the coefficient in the fixed effect (1.000534) was higher than the coefficient in the difference GMM (0.734740). From this we decided to apply the system GMM as the appropriate model for estimating the model

Table 3.3 A Table Showing First Difference GMM Results

Variable	Coefficient
LY(-1)	0.734740
LEDU	0.048232
LAGR	-0.011077
LLN	0.190403
LPOP	-0.135437

Source : Authors Compilation

SOURCE: AUTHORS COMPILATION

3.5.2. Results Interpretation

Table 3.4. Summary Of Results From The System GMM analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob
LY(-1)	0.782060	0.009786	79.91521	0.0000
$LEDU$	0.040576	0.009862	4.114265	0.0000
$LAGRI$	0.027092	0.005950	4.553109	0.0000
$LPOP$	0.047597	0.015242	3.122755	0.0019
LLN	0.427937	0.031479	13.59422	0.0000
Number of observations	394			
Year dummies	NO			
Number of countries	39			
Dependent Variable	LY			
Instrument rank	39			

The impact of a lagged dependent variable y (-1) (agricultural productivity in the previous period on agricultural productivity):

A percentage change in the lagged dependent variable (agricultural productivity in the previous period) is associated with a 0.782060 percent increase in agricultural productivity in the short run, holding other variables constant. The p-value associated with the lagged dependent variable is less than 0.05 % which indicates that the null hypothesis can be rejected. Therefore that the lagged dependent variable has a statistically significant impact on agricultural productivity. Also the p value for the lagged dependent value is very important since it demonstrates that the model was robust

The Impact Of Public Expenditure On Education (LEDU) On Agricultural Productivity:

The results in the table indicate that there is positive relationship between public education expenditure and agricultural expenditure. This is so because, the results in the table shows that a percentage increase in the public education spending is associated with a 0.040576 percent increase in current agricultural productivity, ceteris paribus. The results also indicate that the public expenditure on education has a significant impact since the p value was less than 0.05. This result agrees with the findings of Eric and Elfreda (2014) whose results indicated a positive relationship between government investment in education and agricultural productivity in Ghana

The results are further in agreement with Das and Sahoo (2012) who carried out a specific study about the influence of farmers education and agricultural productivity in Odisha. Unlike our study Das and sahoo (2012) used the cobb-Douglas production function in investigating the relationship between the variables, the findings of the study revealed that there was a positive and significant relationship between farmer's education and agricultural productivity. The study revealed that levels of education reduce rural poverty through agricultural productivity enhancement. This finding is in line with our study that revealed that there was a positive relationship between public expenditure on education and agricultural productivity

Idrees and Siddiqi (2013) conducted a study on the impact of public expenditure on economic growth, the outcomes of the study suggested that there was a positive impact public education on economic growth which was more noteworthy for developing countries than the developed countries, such results also supported our findings that public expenditure on education had a positive and significant impact on agricultural sector in SSA . Another study econometric analysis study conducted on Turkey also pointed out that there existed a positive relationship between public spending on education and economic growth (Mercan and Sezer, 2014). Hussin, et al (2012) analyzed the causal relationship between Education expenditure and economic growth, through conducting a times series analysis, the findings of the study showed that there exists a significant long run relationship between government expenditure on education and economic growth. These and more studies all reinforce the reliability of the finding of the current study

The Impact Of Public Expenditure On Agriculture (LAGRI) On Agricultural Productivity (LY)

Holding other variables constant, a percentage change in public expenditure on agriculture (LAGRI) is associated with a 0.027092 percent increase in agricultural productivity in the short run. Public expenditure on agriculture (LAGRI) variable is significant since the p-value is less than 0.05%. This finding is related to a study by Shyjan (2007) who investigated the impact of public expenditure on agricultural productivity in India. Shyjan's findings indicated that there was a positive relationship between public expenditure and agricultural productivity

In Nigeria Ewubare, and Eyitope,(2015)Analyzed the impact of government spending on the agricultural output. The authors applied a quasi-experiment design and time series data, the findings indicated a positive but not significant relationship. The findings of our study differ from Ewubare, and Eyitope,(2015) since our study established a positive relationship between public spending on education and agricultural productivity. Our study as well used the system GMM that was more rigorous than the time series data for a particular country

The Impact Of Rural Population (LPOP) on Agricultural Productivity (LY)

Rural population was introduced as a control variable in the model, the results on the impact of rural population in agricultural productivity shows that there is a positive relationship between these two variables. This is so because a percentage increase rural population variable is associated with a 0.047597 percent increase in agricultural productivity at a significance level below 0.05 in the short run, holding other variables constant. (Luwemba Musa Maswanku;2023;138-153)This finding is supported by the study by Schneider et al. (2021) who revealed that there was a positive relationship between population and agricultural productivity.

The impact of land for agriculture (LLN) on agricultural productivity (LY)

According to the results, a percentage change in the land for agriculture which was also used as control variable is associated with a 0.427937 short run percent increase in agricultural productivity, ceteris paribus. The land for agriculture had a p value less than 0.05% which suggested that land for agriculture variable had a significant impact with agricultural productivity. In support of this finding, Fuglie (2018) noted that an increase in the size of agricultural land was positively related to agricultural productivity

Table 3.5. A table showing the model diagnostic tests:

Test	Results
AR(2)	0.9498
Hansen Statistic	0.174

Source : Authors Computation

Two diagnostic tests were conducted to ensure that there is instrument validity. The first test was the Hansen statistic according to Roodman (2009) the Hansen test p value should be between 0.1 and 0.25 for it to be trusted the results in the table reveal that the Hansen statistic is 0.174. This value shows that null hypothesis cannot be rejected and hence suggesting that the instruments used in the model were valid and that the model was robust

Another test was the AR (2), this is used in testing for autocorrelation of the error term. While testing for the AR(2), failure to reject the null hypothesis of no second- order serial correlation implies that the original error term is serially uncorrelated and that the moments conditions are correctly specified, that is to say the AR(2) value should be greater than 0.05. The results in the table shows n AR (2) value which is 0.9598. This value is greater than 0.05 and therefore the null hypothesis is not rejected. This therefore suggests that the moments and conditions were correctly specified and that the model is robust

Conclusion

The study was aimed at investigating the impact of public expenditure on education on agricultural productivity. This was mainly predicated on the hypothesis which stated that hypothesis; an increase in public expenditure on education leads to an increase in agricultural productivity. After conducting the study, the hypothesis that suggested that an increase in public expenditure on education leads to an increase in agriculture productivity was accepted. This finding is in line with other studies like setshedi and mosikari (2019) who's study on the topic using the VAR estimation method, revealed that public spending in agriculture contributed to agricultural productivity. Also the study by Ewubare and Eyitope (2015) agrees with the findings of this study in that it revealed

that an increase in public expenditure in education had a positive impact on agricultural productivity

For countries in SSA, this implies that governments should design their fiscal programs to cater for an increase in public expenditure on education programs in order to boost the value of agricultural production in the region. The findings of the study also highlight and strengthen the recommendation of the Maputo (2003) declaration which had recommended that all African countries should invest ten percent of their budgets in agriculture if they are to achieve food security and achieve economic growth

The positive relationship between public expenditure on agricultural productivity can be theoretically underpinned by through intricate dynamics of the human capital theory and the positive externalities that accrues from investing in education (Holden and Biddle, 2017). Human capital theory suggests that individuals can enhance their productivity and efficiency by investing in education, training, and other skills. It views human capital as a set of attributes—such as educational attainment, knowledge, experience, and skills—that contribute to a worker's productivity, in this case education enhances farmers productivity which in turn increases on agricultural productivity. Of the benefits that arise out of investing in education is the adoption and development of new technics of production which can as well cater for the rise in agricultural production (Wu and liu2021). The findings of the study can be collaborated by Reimers and Klasen (2013) who studied the role of education on agricultural productivity, the results of their study showed that increased schooling has a positive impact on agricultural productivity. Reimers and Klasen (2013) findings underpins the findings of the study on the impact of public expenditure on education and agricultural productivity since spending on education is directly related to the increase in the number of learner's enrollment in developing countries which means increase in the number of skilled workers in the agricultural sector. Also, numerous studies have suggested that the farmers who are better educated are also better managers which makes them good at decision making hence promoting efficiency and productivity in the agricultural sector (Asadullah and Rahman 2009). Finally, a study by Eric and Elfreda (2014) investigated the effects of education on the agricultural productivity of farmers in Ghana, their study revealed that investment in the education of farmers promoted agricultural productivity, in line with the findings of this study, the

Eric and Elfreda (2014) recommended that governments should investment more in educating rural populations so as to improve on agricultural productivity.

This study delved into the study of the impact of public expenditure on agricultural productivity in Sub-Saharan Africa, using System GMM and utilizing panel data from 39 countries in the region. The study focused on one primary hypothesis that suggested a positive relationship between public expenditure in education and agricultural productivity. The findings of the study not only enhance our understanding of the relationship between public expenditure on education and agricultural productivity but also offer policymakers valuable insights into the effective allocation of public resources to stimulate agricultural productivity. The study also underscores the need for African countries to put implement the recommendations of the 2003 Maputo Declaration which recommended that governments in SSA should 10% of their annual budgets to agriculture as a way of reducing poverty and ensuring food security.

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