



Research Paper No. 18

Boosting Agricultural Productivity and Food Security in Africa: A Case Study of Ghana

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Increasingly, growth in productivity is seen as key to agricultural transformation and improving food security in Ghana.¹ Agricultural productivity spurs manufacturing sector growth and, in turn, economic transformation, by providing cheap raw materials for processing, helping moderate food price inflation, thereby leading to higher industrial wages. Increased agricultural productivity is also an effective tool to reduce poverty and enhance inclusive growth, as 71 percent of Ghana's rural population depends on agriculture for their livelihood. Ultimately, boosting agricultural productivity promotes peace and stability through better food and income security.² Despite being highly ranked on the Economist's Global Food Security Index in 2016, Ghana produces only 51 percent of its cereal consumption needs, 60 percent of fish requirements, 50 percent of its meat, and less than 30 percent of the raw materials needed for agro-based industries.³ These production deficits have led to a rising food imports bill, which already consumes 74 percent of all agricultural export revenues. Low agricultural productivity and high import costs threaten food security and potentially peace and stability and makes the country vulnerable to global price fluctuations, which cause domestic food prices to rise, as witnessed during the 2008 and 2011 food crises.

Over the years, the government has established several policies and programs to enhance agricultural production and transform the sector in Ghana. Key policies since 2002 include the Food and Agriculture Sector

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Development Policies (FASDEP I-2002 and FASDEP II-2007). This policy emphasizes the need for sustainable utilization of all resources and commercialization of activities in the sector with targets on few commodities to ensure food security and income diversification of poor farmers.⁴ In addition, the Medium Term Agriculture Sector Investment Plan METASIP (2011-2015) was designed as a sector-wide investment plan to implement development policies outlined in the FASDEP II. The overall goal of METASIP is to achieve 10 percent budgetary allocation to the agriculture sector, increase yields, and enhance access to market. In line with the above government policies, and also in response to the 2008 global food prices crisis, specific programs such as the Fertilizer Subsidy Program, the Block Farms Program, the Agricultural Mechanization Service Enterprise Centre (AMSEC) program, and the National Buffer Stock Company (NAFCO) were introduced to boost production and protect against such crises in the future. Despite these initiatives, agricultural productivity remains a challenge in Ghana. This paper explores the challenges to and prospects for enhancing Ghana's agricultural sector productivity and food security.

Despite the risk of food insecurity and the efforts of Government initiatives, agricultural productivity—measured by both land and labor productivity—remains low in Ghana relative to comparable African countries. Despite rises in cereal yields since 2000, increasing from 1309 kilogram per hectare (kg/ha) to 1703kg/ha in 2014 with an average of 1501kg/ha, comparators in Sub-Saharan Africa (SSA), specifically Ethiopia, Côte d'Ivoire, and Kenya, have outpaced Ghana's yields. Broadly, SSA as a region exceeds Ghana with average yields of 1642kg/ha. Today, nutrition and food security challenges persist in Ghana, especially in the three northern regions (Upper East, Upper West, and Northern Regions), with approximately 1.2 million Ghanaians, or 5 percent of the population, estimated to be food insecure as of 2014.⁵ This raises the question: Why has agricultural productivity remained low in Ghana?

Why has agricultural productivity remained low in Ghana? The Multiple Factors

Key among the reasons for low productivity growth is low use of agricultural materials needed for farm production (i.e., inputs) and poor access to inputs and crop production (i.e., outputs) markets. Evidence shows that sustained agricultural productivity growth largely comes from expanded use of yield-enhancing inputs, especially of modern inputs like improved seeds, fertilizers, and other agrochemicals as well as from mechanization, irrigation, and farmer education, as was the case in Asia and Latin America.⁶ While lessons learned can be derived from the Asian Green Revolution, they need to be tailored to the Ghanaian context.

Low Input Use

Poor Adoption Rate of Improved Seeds

While efforts have been made to introduce improved seeds, the overall adoption rate is very low. For example, despite the release of more than 88 varieties of modern improved seeds or hybrids, with facilitation from local agricultural research institutions and the Alliance for Green Revolution in Africa (AGRA), there was very little adoption of the seeds by Ghanaian farmers. Evidence shows mixed outcomes from adopting improved seeds across various food crops. For instance, more than 90 percent of soybean farms planted improved seeds compared with only 10 percent of yam farms and 5 percent of maize farms. One explanation for the difference in uptake is existence of a functional soybean value chain system that seem to support farmers to adopt the hybrid seeds. However, research shows that the factors underpinning the generally low adoption rates of improved seeds include high annual costs to purchase seeds and high production costs since these varieties

demand more fertilizer.

Low Fertilizer Usage

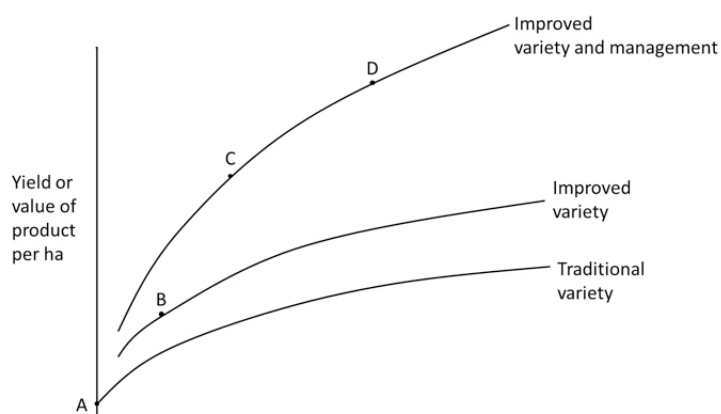
Despite massive growth in fertilizer consumption since the introduction of the National Fertilizer Subsidy Program in 2008, fertilizer consumption in Ghana is still low. Fertilizer consumption currently stands at 25.3kg/ha of arable land, far below the average of other African countries implementing similar subsidy programs, such as Malawi (64kg/ha) and Nigeria (56kg/ha). Furthermore, evidence from a 2017 research publication from the International Food Policy Research Institute (IFPRI) shows that Ghana's fertilizer subsidy program disproportionately benefited the well-off farmers while most vulnerable smallholder farmers seem to have been marginalized.⁷ This situation has been further compounded by the recent rise in price of fertilizer by 43 percent, from GHS 478 per metric ton in 2008 to GHC 682.7 per metric ton in 2012, which has discouraged many farmers from participating in these programs.⁸

Poor and Inadequate Irrigation Infrastructure

Despite the importance of irrigation to agricultural yields and to complement the adoption and application of other productivity-enhancing inputs, the issue of irrigation has not been given sufficient attention.⁹ Recent investment in irrigation has been low, with most of the irrigation schemes developed decades ago. Additionally, most of these old irrigation projects have been underutilized, with the exception of the Kpong irrigation scheme in the Volta region of Ghana, where the adoption of improved seeds and fertilizer improved yields of rice farms. This poor investment in irrigation is illustrated by the fact that of Ghana's total 4.7 million ha of cultivable area in 2014, only 36,000 ha—less than 0.8 percent—was irrigated. Of the gross estimated 1.9 million ha of potentially irrigable areas, less than 2 percent has been developed.

Weak Farmer Education and Support

Farmers need a good working knowledge of the benefits of productivity-enhancing inputs, as illustrated by Figure 1. While many actors, including the government, NGOs, and the private sector, provide agricultural advisory services (i.e., extension services) in Ghana, the services are not reaching the majority of smallholder farmers. Overall, service delivery in Ghana is poor, with available data from the Ministry of Agriculture indicating one extension officer to 15,000 farmers.¹⁰



Beyond the low rate application of the productivity-enhancing inputs as discussed above, the following factors also create hinder the productivity and profitability of farmers.

Figure 1: Illustrated Relationship between the Application of Modern Inputs and Yield or Value of Product per Hectare¹¹

Poor Access to Output Markets

As in many other African countries, poor access to markets presents significant challenges for a majority of subsistence farmers in Ghana. Farmers interested in commercializing their farms and increasing productivity are usually faced with wide price volatility in the output market due to poor post-harvest logistics and ineffective institutions responsible for regulating and promoting market activities. In some areas, especially in northern Ghana, the lack of established state agencies to coordinate all of the activities along the value chain in the food crops sector has resulted in development of middlemen who have taken control of the market by buying agricultural produce at low prices from the farmers (who are often desperate to sell) while inflating their own profits during harvest periods. Despite the government's establishment of the National Buffer Stock Company to purchase excess produce at guaranteed prices from farmers in order to reduce post-harvest loss, farmers still lack sufficient access to output markets.

Unfriendly Financial Policy Environment

Access to credit at affordable interest rates to invest in productivity-enhancing inputs remains a challenge for Ghanaian farmers due to unfriendly financial environments. Due to high weather and market risks, financial institutions like commercial banks find it expensive to lend to farmers. In addition, poor macroeconomic policies have made interest rates charged on loans to farmers very high—currently they are over 20 percent annually. At such high interest rates, small and medium-sized farmers are often unable to access loans to invest in productivity-enhancing inputs and infrastructures. Even though rural banks in Ghana are mandated by the Central Bank to allocate 50 percent of all loans to agriculture-related activities, in reality few banks comply due to the high interest rates charged on loans. Currently, the share of commercial bank lending to farmers in Ghana is only 4 percent¹² with access to finance for women, key actors in the agricultural sector, even more limited.¹³

Public Spending: The Case of Ghana

Several key reasons have been offered to explain Ghana's persistently low agricultural productivity, including the inadequate allocation of public spending on agriculture. Is Ghana's low productivity growth a result of under-allocation of public resources to the sector or because public resources are being inefficiently applied? In short, is the root cause "under-spending" or "inefficient spending?"

Research has shown that there is a positive correlation between public spending and agricultural productivity growth.¹⁴ Notably, increased public spending helped to drive the Asian Green Revolution in South and East Asia. China and India, for example, made constant average allocations of 10 percent of total public spending to the agriculture sector in the early 1980s, with sector spending focused on infrastructure, services, and technology.¹⁵ In Ghana, studies show that a 1 percent increase in public spending on agriculture is associated with a 0.15 percent increase in agriculture labor productivity.¹⁶ In addition, increased public spending in the agricultural sector provides incentive packages to the private sector that encourage investment and further drive growth in productivity.

Given the lessons learned from some successful African countries and globally regarding the correlation between agricultural public spending and productivity growth, how do we determine if the low productivity growth witnessed in Ghana is due to underfunding or inefficient application of resources?

Ten years after the 2003 Maputo Declaration and subsequent 2014 Malabo Reaffirmation which recommended at least 10 percent budgetary spending on agriculture, the average share of Ghana's public agriculture spending to total national expenditure has only marginally improved. Between 2005 and 2015, agricultural spending as a share of total national budget averaged just 2.89 percent—less than SSA's average of 3.96 percent. Similarly, the average share of Ghana's public agricultural spending to agricultural output trends averaged 2.6 percent between 2005 and 2014.

Based on the World Bank's 2016 Agriculture Orientation Index, which accounts for the size of the sector relative to the national economy, Ghana falls short on allocating optimal public resources to the agriculture sector. Despite an upward trend over the past decade, Ghana was one of the 10 worst performing countries (out of 47 African countries) in terms of spending in the agriculture sector with a score of 0.13 (out of a maximum of 1) in 2014. The relatively low resource allocation to the agriculture sector is a cause for concern as it adversely affects investments towards productivity-enhancing inputs and affects the ability of the sector to attract private sector investment.¹⁷

Efficiency in Public Agriculture Spending for Productivity Growth

Efficiency in public spending lays the foundation for raising farm productivity and the transformation of the entire agricultural sector. Expenditures on certain public goods and services such as: (1) research and development (R&D); (2) extension services; (3) irrigation; and, (4) rural roads, deliver high productivity returns. For instance, the productivity returns of spending on R&D is estimated at 37 percent in SSA. At the national level, estimates show that every one dollar spent on R&D generates an additional three dollars in returns.¹⁸ In contrast, investment in recurrent spending such as paying salaries, administrative costs, and inputs subsidies have low productivity returns.¹⁹

Public Spending on Research and Development

Ghana's public spending on agricultural R&D as a percentage of agricultural value added (agGDP) has increased from 0.5 percent in 2000 to 1 percent in 2014, in compliance with the African Union's target. However, the share of Ghana's public agricultural spending on R&D out of the total agricultural expenditure averaged at just 6.2 percent between 2006 and 2012. Aside from the low allocation to R&D, the Council for Scientific and Industrial Research (CSIR), which is responsible for more than half of all R&D expenditures, devotes 78 percent of its budget to salaries, leaving the remaining 22 percent for operations and capital investment.²⁰ As a result, scientists lack the needed resources to develop and advance new technologies necessary to improve Ghana's agricultural productivity.

Public Spending on Farmer Education and Technology Transfer

Educating farmers about modern farm management practices is crucial to productivity growth. The real productivity effect of all the yield-enhancing inputs depends on the knowledge of farmers to apply those inputs. Of the total agriculture public spending in 2012, the share for extension services was only 6.5 percent, and spending averaged just 6.2 percent between 2006 and 2012. Encouragingly, there seems to be renewed commitment by the government to improve farmer education. The government recruited over 1,200 new farm education officers by the second quarter of 2017 as part of its flagship program "Planting for Food and Jobs."

²¹ Additional signs of improvement include the introduction of some new models of rural advisory projects like private-sector-based farmer education and training programs for farmer groups, which utilize modern technology to provide farmers with the tools required to overcome the challenges of the ineffective traditional

extension systems.

Public Spending on Rural Roads

High transaction and transportation costs caused by weak infrastructure in rural areas discourage farmers from investing in productivity-enhancing inputs.²² In Ghana, the department of feeder roads under the Ministry of Roads and Highway is responsible for the provision of access to these rural, feeder roads. But the Ministry of Agriculture also allocates specific expenditure towards improvement of rural roads to help reduce transaction costs of farmers. In this regard, investment in rural roads by the Agriculture Ministry towards rural roads has been low and volatile over the past decade. From as high as 34 percent out of total budget allocation in 2006, spending declined to 2.8 percent in 2012 and averaged at just 9.7 percent between the same periods. Overall, the share of agriculture expenditure on R&D, farmer education, and rural roads averaged less than 25 percent of the total budgetary allocation to the entire agriculture sector between 2006 and 2012.

In contrast, an average of 21 percent of expenditures was allocated to input subsidies alone between 2006 and 2012. Specifically, the share of the ongoing fertilizer subsidy program accounted for 20 percent of total budget allocation to the Agriculture Ministry. Ghana's agriculture sector is indeed underfunded and needs more resources to boost productivity. However, reforms should also aim to improve efficiency by first targeting areas with high productivity returns. If efficiency is not addressed, the current spending composition is unlikely to drive productivity towards the levels needed by the country or the levels witnessed in Asia and some African countries, especially North Africa and South Africa.

Conclusion

How can public agricultural spending transform the agriculture sector through high productivity growth, thereby enhancing food security in Ghana? Policymakers and political leaders should make resource allocation decisions oriented towards maximizing the welfare of the people and reducing food insecurity. To do so, the government of Ghana needs to first ensure efficiency of public spending in agriculture by focusing spending on high productivity activities, followed by increasing allocation to drive productivity.

For a set of policy options and recommendations related to budgeting for productivity and food security in Ghana, see the accompanying Africa Program Policy Brief No. 12 by Francis Abebrese.

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Cover Image: Madam Laadi Forkinam standing in her farm in Ghana. Credit: USAID, Creative Commons. <https://flic.kr/p/oPUhpX>.

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