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TRENDS AND COMPOSITION OF GOVERNMENT EXPENDITURES ON AGRICULTURE IN GHANA, 1960–2015

Samuel Benin[1]

INTRODUCTION

When African leaders launched the Comprehensive Africa Agricultural Development Programme (CAADP) in Maputo in 2003, they committed to spend 10 percent of their national expenditure budget on the agricultural sector. This commitment, popularly known as the Maputo Declaration, was designed in pursuit of a 6 percent agricultural growth rate each year. The African Union (AU) developed a guidance note on the measure to use to track progress in the commitment on government agriculture expenditure (GAE). The measure is based on the classification of the functions of government (COFOG), and the definition of GAE as the expenses of the government sector on agriculture—crops, livestock, forestry, and fishing and hunting (AU-NEPAD 2015). Specifically, the measure is the share of GAE in government total expenditure (GTE), which is GAE*100/GTE. Two recent agricultural public expenditure reviews (agPERs) conducted in Ghana show expenditure shares that are overestimated for measuring progress toward the Maputo 10 percent target, ranging from 6.5 to 21.2 percent in 2001–2011 (MOFA 2013) and from 5.8 to 7.5 percent in 2012–2015 (MOFA 2017). This is because the studies used concepts like "COFOG-plus" or "enhanced-COFOG" to include expenditures that are not meant to be included according to the AU guidance note. One example of this discrepancy is that the studies included government expenditures on feeder roads in GAE, although feeder roads promote socioeconomic development of entire rural communities and not just the agricultural sector. Also, expenditures of the Ghana Cocoa Board (Cocobod) were included in GAE, even though Cocobod, although responsible for the management and development of the cocoa subsector, is not part of the government sector. It is a public corporation that engages in market-based production activities financed entirely by the cocoa subsector that it serves, and there is no transfer from taxpayers through the Cocobod to the entire agricultural sector.[2] Along with these inconsistencies with the official AU guidance note, the estimates and analyses in the two agPER studies mask the relatively low government expenditure in the noncocoa subsector, and may undermine efforts to boost provision of public goods and services in this subsector, which accounts for about 90 percent of Ghana's agricultural gross domestic product (GDP). The cocoa subsector accounts for the remaining 10 percent of agricultural GDP.

Each year, the auditor general reports on the consolidated public accounts of the general government sector according to the COFOG, which in recent years are also consistent with the official AU guidance note for tracking progress toward the Maputo 10 percent target. The data from these reports for 2012–2015, for example, show estimates of the share of GAE in GTE that are much lower and in the range of 0.5 to 1.7 percent (Table 1). These results indicate that the government of Ghana is much further from meeting the CAADP 10 percent agriculture expenditure target than the two agPER studies portray.

[1] Samuel Benin is deputy division director in the Africa Regional Office, IFPRI.

[2] An accompanying note (Benin and Tiburcio 2019) discusses these issues further and presents revised estimates according to the official AU guidance note. For further discussion on the government sector versus the public corporations sector, see IMF (2014).

Table 1 : Expenditures of the general government sector on agriculture in Ghana, 2012–2015

Indicator	2012	2013	2014	2015	Average
GTE, million GH₵ at 2006 prices	8,448.27	10,578.86	11,874.07	11,169.17	10,517.60
GAE, million GH₵ at 2006 prices	141.21	106.16	86.61	59.44	98.36
Share of GAE in GTE, %	1.7	1.0	0.7	0.5	1.0

Source: Authors' calculations based on CAGD (2018) and deflators from GSS (2017).
Notes: GTE = government total expenditure; GAE = government agriculture expenditure.

Knowing the rationale for and the evidence of growth effects of public investment in agricultural development (see Mogues et al. [2015] for a recent review in developing countries), the low and declining trend of GAE in Table 1 raises red flags. To explore the issues further, this policy note analyzes the trends and composition of government expenditures from 1960 to 2015 in the agricultural sector, which in Ghana coincides with the noncocoa agricultural subsector or all of agriculture excluding cocoa. The cocoa agricultural subsector is excluded because public sector support to cocoa is organized through Cocobod, a public corporation with its own mandate and expenditure and revenue generation processes that engages in market-based production activities that are financed entirely by the cocoa subsector. By comparing the trends and patterns of GAE to GDP in the noncocoa subsector, this note derives implications to help focus policy actions needed to raise productivity and growth in the noncocoa subsector. Because the CAADP Biennial Review process determined that Ghana was not on track to achieving the Malabo Declaration targets (AU 2018), this policy note may provide useful guidance for these future policy actions.

This analysis uses data from various sources. Public expenditure data are from the compilation by Benin (2016), updated with data on more recent years from annual reports on the financial accounts and statements of the government (CAGD 2018). Data on GDP and deflators are from the Ghana Statistical Service (GSS 2017) and the World Bank's World Development Indicators (World Bank 2017). Briefly, the results show that the share of GAE in GTE for the noncocoa subsector has declined over time from an average of around 8 percent per year in 1960–1990 to only 2.5 percent per year in the CAADP era (after 2003). The share of GAE on both research and development and on extension, for example, have suffered, even though these areas are known for their high returns and long-term benefits. The share of GAE on general administration, however, has increased far more rapidly in recent years, raising questions about the Ghanaian government's priorities in the development of this subsector.

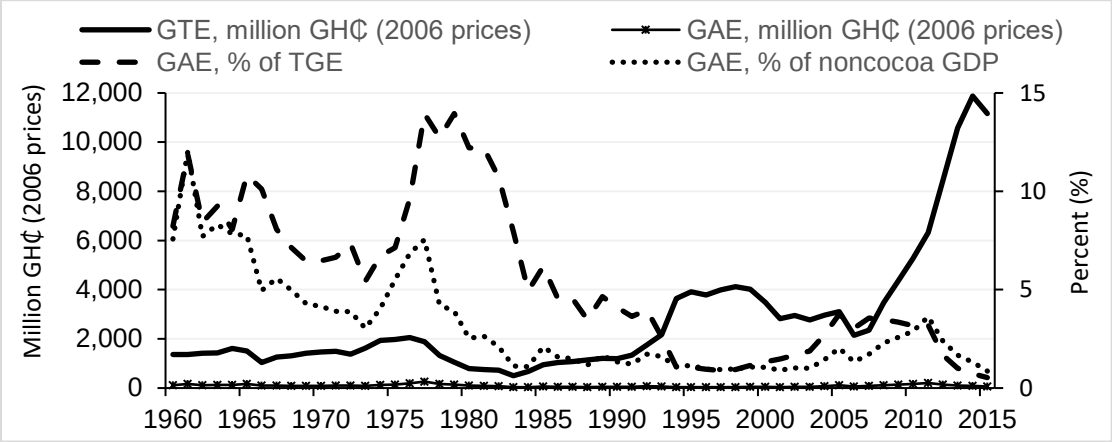
TRENDS IN GAE IN THE NONCOCOA SUBSECTOR, 1960 TO 2015

Figure 1 shows that the share of GAE in GTE for the noncocoa subsector generally has declined from 1960 to 2015, peaking at 14 percent in 1977 and 1979. The share averaged about 8 percent per year until the 1990s, which recorded the lowest share of about 2 percent per year, and then rose marginally to about 2.5 percent per year in the CAADP era (after 2003). The lower shares of GAE in GTE since the 1990s is a result of much faster GTE real growth than GAE real growth, especially since 2007 when GTE grew at an average rate of 22.5 percent per year whereas GAE declined by 5.1 percent per year on average.

Some insights into the sharp contrast in the growth rates of GTE (increasing) and GAE (decreasing) can be obtained by looking at the trend in the composition of GTE for the entire economy, as shown in Figure 2. In addition to agriculture, expenditures on the core functions of government (infrastructure—transport and communications, education, health, social protection, and defense) have declined. However, expenditures on general public services increased massively, reaching two-thirds of GTE in 2013–2015 (Figure 2a). Figure 2b shows that the increase in expenditures on general public services has gone to management of the public debt (37.5 percent of it), other financial and fiscal affairs (12.6 percent), and other unspecified general services (44.6 percent). Figure 2c gives further insight via the economic classification of GTE, which shows that the bulk of GTE has shifted to managing foreign exchange (22.7 percent of GTE in 2013–2015), interest payments (21.0 percent), and for-

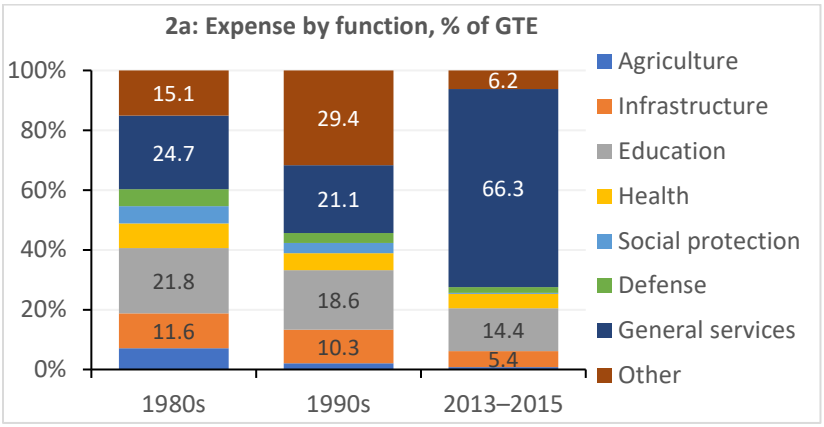
eign-financed investments (14.1 percent). With 32.8 percent of GTE going to compensation of employees (payment of wages and salaries and social contributions for all government staff and workers), this means that only 5 percent has been spent on actual operations, including use of goods and services (Figure 2c).

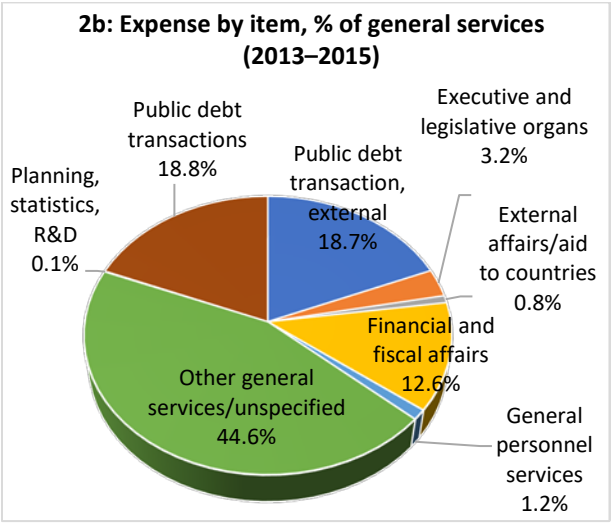
Figure 1 : General government expenditure on the noncocoa subsector in Ghana, 1960–2015

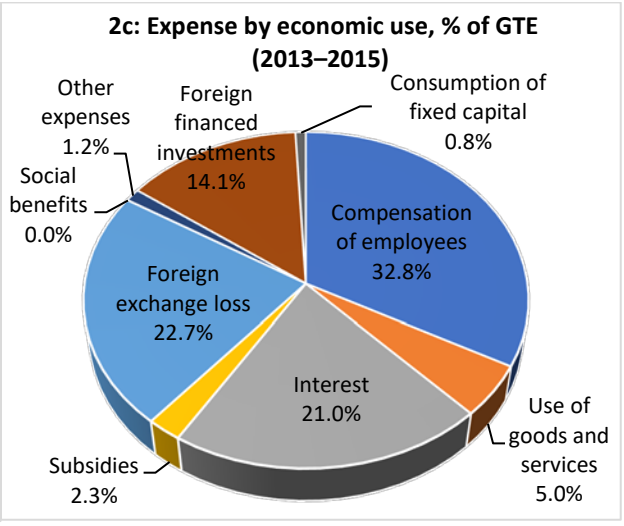


Source: Authors' calculation and illustration based on Benin (2016), CAGD (2018), GSS (2017), and World Bank (2017).
Notes: GTE = government total expenditure; GAE = government agriculture expenditure. Noncocoa is all agriculture (crops, livestock, forestry, and fishery) except cocoa.

Figure 2 : Composition of government total expenditure (GTE) in Ghana, 1980–2015







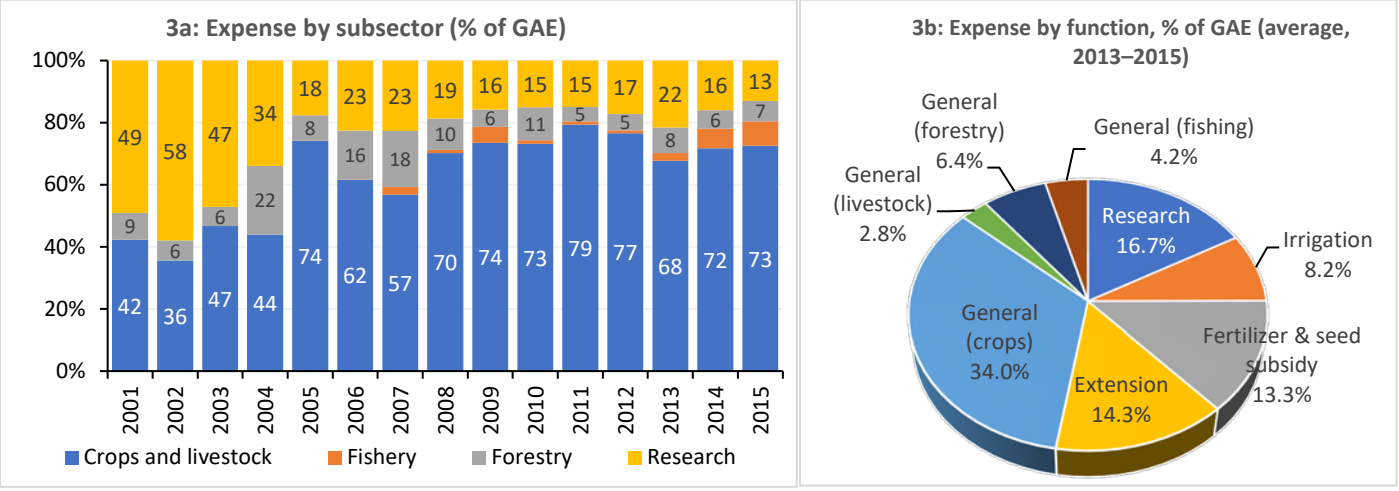
Source: Authors' calculation and illustration based on Benin (2016) and CAGD (2018).
Notes: GTE = government total expenditure; R&D = research and development.

COMPOSITION OF GAE IN THE NONCOCOA SUBSECTOR, 2001–2015

Next is to examine how GAE in the noncocoa subsector has been allocated to different subfunctions and activities. Here, the data are from 2001 to 2015, with detailed results presented in Figure 3. In general, Figure 3a shows that spending on research has declined from an average of nearly 50 percent of GAE per year in 2001–2004 to about 17 percent per year in 2011–2015. Spending on forestry seems stable at around 5 to 8 percent, following highest shares of 16 to 22 percent in the mid-2000s. Spending on fishing has gained from a low point, with crops and livestock increasing its already large share, averaging 70 to 75 percent of GAE (although the bulk goes to crops). Figure 3b, which is based on the results from the agPER study (MOFA 2017), provides further insight on the functional allocation of GAE in the most recent years of 2013–2015. Consistent with the pattern with GTE, nearly one-half of GAE was for general administration (34 percent for crops, 6.4 percent for forestry, 4.2 percent for fishing, and 2.8 percent for livestock). For the core functions, extension consumed an annual average share of 14.3 percent of GAE, followed by fertilizer subsidies at 13.3 percent and irrigation at 8.2 percent.

Because the high returns and the long-term productivity- and growth-enhancing benefits of investments in research and development, extension, and irrigation are well known, the declining trend in government spending on research and extension observed in the agPER study (MOFA 2017) is concerning.[3] Although spending on subsidies for fertilizers and improved seed also took a hit and declined over time, and there was no subsidy program in 2014, such subsidies were greater than spending on irrigation until 2015 and nearly as large as spending on extension. Unlike investments in research or irrigation, which contribute to stocks of public capital, fertilizer and seed subsidies have only short-term benefits, as they are fully consumed in their periods of use. Furthermore, the bulk of the expenditures was for recurrent activities, which overall accounted for 57 percent of GAE in 2012 and rose to 87 percent in 2015 (MOFA 2017).

Figure 3 : Composition of government agriculture expenditure (GAE) in the noncocoa subsector in Ghana, 2001–2015



Source: Authors' calculation and illustration based on Benin (2016), CAGD (2018), and MOFA (2017).
Notes: GAE = government agriculture expenditure. Before 2005, expense on fishing was captured as part of the expense on crops and livestock. Noncocoa is all agriculture (crops, livestock, forestry, and fishery) except cocoa.

EXPENDITURE-TO-GDP RATIOS IN THE NONCOCOA SUBSECTOR, 2001–2015

The following analysis covers the years from 2001 to 2015, corresponding to the years for which both expenditure and GDP data are available for the subdivisions in the noncocoa subsector discussed above. It compares the results to those for the cocoa subsector to derive some policy implications for the noncocoa subsector. Detailed results are shown in Table 2. Between 2001 and 2015, total agricultural GDP grew at an annual average rate of

[3] See recent review of the evidence in developing countries by Mogues et al. (2015) and Benin and Odjo (2018).

2.4 percent per year, which was dominated by growth in noncocoa crops and livestock (3.0 percent) and forestry (3.0 percent), followed by cocoa (2.8 percent), with fishing experiencing a decline (−4.0 percent). On average over the same period, the noncocoa subsector accounted for nearly 90 percent of the total agricultural GDP (noncocoa crops and livestock 70.1%, forestry 11.2%, and fishing 8.5%), with the cocoa subsector taking up the remaining 10 percent. Together, these figures imply that the noncocoa subsector contributed about 88 percent toward the overall agricultural GDP growth rate in 2001–2015, and cocoa contributed the remaining 12 percent—making the noncocoa subsector the engine of growth in the agricultural sector over these periods.

Looking at the expenditure-to-GDP ratio across the different subdivisions, the government expenditure on noncocoa subsector was equivalent to only 1.8 percent of the noncocoa agricultural GDP. Compared to the cocoa subsector, Cocobod expenditure was equivalent to nearly 30 percent of cocoa GDP, almost 15 times more than the relative expenditure-to-GDP ratio in the noncocoa subsector. Furthermore, the expenditure-to-GDP ratio has been growing at a moderate pace in the noncocoa subsector (3.4 percent per year), compared to the more rapid pace in the cocoa subsector (7.0 percent per year).

Table 2 : Agricultural expenditures and GDP by subsector, 2001–2015

Subsector	Expenditure		GDP			Expenditure-to-GDP ratio	
	Million GH₵ (2006 prices)	Growth rate (%)	Million GH₵ (2006 prices)	Share of total (%)	Growth rate (%)	Value (%)	Growth rate (%)
Noncocoa	101.25	5.8	5,572.25	89.8	2.3	1.8	3.4
Crops and livestock	63.87	10.8	4,348.25	70.1	3.0	1.6	7.5
Fishing	1.92	40.4	530.47	8.5	−4.0	0.4	44.8
Forestry	9.60	2.0	693.55	11.2	3.0	1.3	−1.0
Research	25.86	−3.4	n.a.	n.a.	n.a.	n.a.	n.a.
Cocoa	173.09	10.0	633.37	10.2	2.8	26.7	7.0
Total agriculture	274.34	9.4	6,205.62	100.0	2.4	4.3	6.9

Source: Authors' calculations and illustration based on Benin (2016), AG (2018), CAGD (2018), GSS (2017), Ghana Cocoa Board (2018), and World Bank (2017).
Notes: Expenditure on the noncocoa subsector is by the government and expenditure on the cocoa subsector is by the Cocobod. Growth rate is based on fitted line to the values using the "logest" function in excel. n.a. = not available.

WHY IS THE LOW AND DECLINING GAE IN THE NONCOCOA SUBSECTOR OF CONCERN?

This concern derives from both the rationale for and the evidence of the growth effects of public spending in agricultural development—see Mogues et al. (2015) for a recent review of these effects in developing countries. The fundamental notion underlying the growth effects is that public capital and private capital are complements in the production process, so that an increase in public spending that leads to an increase in the public capital stock raises the productivity of private capital and other factors in production. In general, these effects can be categorized into four pathways of impact: technology advancing (typically deriving from spending on research and development); human-capital enhancing (from spending on extension, education, health, sanitation, and the like); transaction-cost reducing (from spending on infrastructure); and crowding-in of private capital (from spending that creates a business-enabling environment). The evidence on Africa and Asia, seen in recent reviews of the evidence (Mogues et al. 2015; Benin and Odjo 2018), shows that the returns to public investment are highest for research and development, followed by infrastructure (especially rural roads), and then education, health, and other social functions. Only a few studies have examined the returns to public spending in Ghana. The ones that have focused on the agriculture sector include Benin et al. (2012), who find that government capital expenditures yield a higher return in the agricultural sector than government spending on recurrent expenditures. However, because the bulk of government expenditure on high-impact functions such as research and development is also recurrent expense for the salaries and benefits of researchers in the national agricultural research system,

the study by Benin et al. (2012) masks the potential higher returns to recurrent research expenses compared to those on administration, management, and broader policy functions that do not yield high impact returns. Another study, Benin (2016), finds that government expenditures on the noncocoa subsector yield a higher return than Cocobod expenditures on the cocoa subsector.

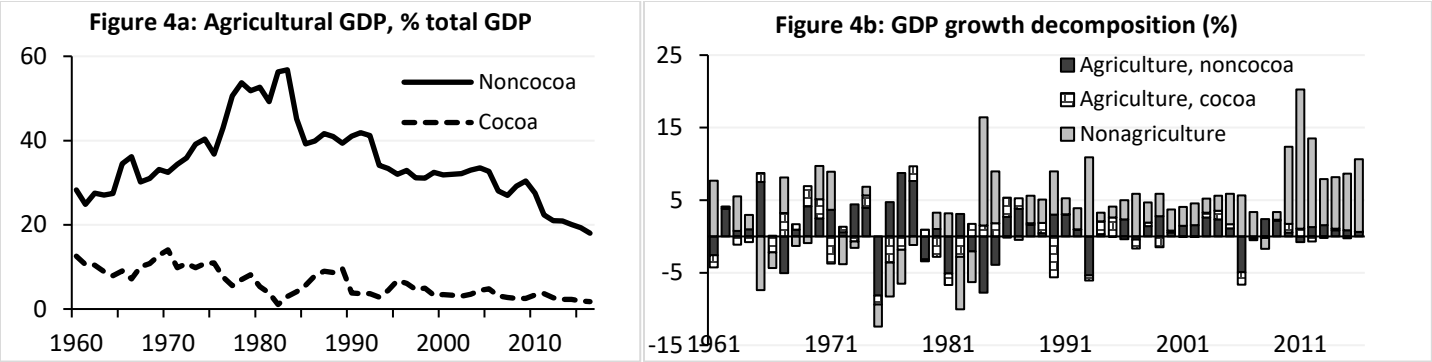
Because few studies have examined the effects of public spending in Ghana, some may argue a reverse causality for the low and declining GAE, which is that the government is spending less because agricultural GDP as a share of total GDP is falling, growth rates in other sectors are higher than in agriculture, or the returns to GAE are low or declining. It is true that agricultural GDP as a share of total GDP is falling (Figure 4a) and that the nonagricultural sector has been growing at a faster rate than the agriculture sector (Figure 4b), especially since Ghana started producing crude oil and natural gas in commercial quantities in 2010. Then, these shifts may create a vicious circle: the government invests less in agriculture because other sectors contribute more to growth, the lower levels of government investment in agriculture lead to declining productivity and slower growth, and consequently the government invests even less in what appears to be an unprofitable sector. To help substantiate or refute these arguments, this analysis examines the data to estimate several correlation coefficients between growth in government expenditures and growth in GDP. Although the correlations do not imply causal relationships, they serve as first-order results that may form a basis for further analysis. For example, correlations that are statistically insignificant may not lend support to the relevant claim, whereas those that are will lend support to the relevant claim and can be further analyzed and substantiated using regression techniques and controlling for other variables or factors.

This analysis looks at two types of correlations. The first is for the reverse causality argument, which is between the annual growth rate in GDP and annual growth rate in expenditure, considering in addition the growth rate for 2-, 3-, and up to 10-year moving averages of the expenditures. The second is for the argument of government expenditures being a driver of GDP, which is between the annual growth rate in expenditures and annual growth rate in GDP, considering in addition the growth rate for 2-, 3-, and up to 10-year moving averages of the GDP. The moving averages provide context for longer-term aspects, which also help reduce any large year-to-year fluctuations in the variables. Within each type of correlations, the estimates are done for GAE and noncocoa agricultural GDP, and compared with those for GTE and total GDP, and then Cocobod expenditures and cocoa agricultural GDP. Detailed results are shown in Table 3.

The results of the first set of correlations do not support the claim with respect to government expenditures on the noncocoa subsector, or for Cocobod expenditures on the cocoa subsector. For GTE, however, reverse causality may be possible for up to three years. Regarding the second set of correlations, the results show that the more likely direction of effect is government expenditures being a determinant of GDP, both in the noncocoa subsector and in the overall economy, but not for expenditures of the Cocobod on the cocoa subsector. Furthermore, the statistically significant effect persists for up to seven years in the noncocoa subsector and up to eight years in the overall economy. The generally larger estimated correlation coefficients for longer moving averages support the notion that the productivity and growth benefits of public expenditures take time to fully manifest.

The above results suggest that both the level and quality of the government's expenditures are important in determining growth in the nonagricultural sector. Because agricultural GDP and its growth is dominated by the performance in the noncocoa subsector (which contributes about 20 percent of total GDP in recent years), the low and declining trend in GAE (and specifically in spending on research and extension) is of concern. In fact, a fitted trendline to the agricultural GDP growth rate from 1960 to 2015 shows a declining trend by almost half a percentage point on average each year. These trends move Ghana further away from achieving another CAADP target—the 6 percent annual agricultural GDP growth rate. It is difficult to see how the situation can be reversed without radically strengthening and improving the quality of GAE.

Figure 4 : Contribution of agriculture to GDP, 1960–2015



Source: Authors' calculations and illustration based on Benin (2016), GSS (2017), and World Bank (2017).
Notes: GDP = gross domestic product. Noncocoa is all agriculture (crops, livestock, forestry, and fishery) except cocoa.

Table 3 : Correlation coefficients between public expenditure and GDP growth rate, 1960–2015

Moving average	GDP on expenditure						Expenditure on GDP					
	Noncocoa agricultural GDP on GAE		Total GDP on GTE		Cocoa agricultural GDP on CobExp		GAE on noncocoa agricultural GDP		GTE on total GDP		CobExp on cocoa agricultural GDP	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
1 year	0.13	0.33	0.39 ***	0.00	0.04	0.79	0.13	0.33	0.39 ***	0.00	0.04	0.79
2 years	0.06	0.68	0.37 ***	0.01	0.14	0.37	0.25 *	0.07	0.36 ***	0.01	0.02	0.89
3 years	−0.02	0.87	0.31 **	0.02	0.28 *	0.07	0.26 *	0.05	0.43 ***	0.00	0.01	0.95
4 years	0.07	0.62	0.27 **	0.05	0.20	0.20	0.23	0.10	0.50 ***	0.00	−0.02	0.91
5 years	0.01	0.95	0.23	0.10	0.08	0.63	0.24 *	0.08	0.47 ***	0.00	0.04	0.81
6 years	0.02	0.91	0.19	0.18	0.09	0.59	0.29 **	0.04	0.38 ***	0.01	−0.04	0.78
7 years	0.04	0.77	0.18	0.21	0.10	0.54	0.29 **	0.04	0.32 **	0.02	−0.17	0.29
8 years	0.01	0.95	0.21	0.14	0.07	0.67	0.21	0.14	0.27 *	0.06	−0.02	0.90
9 years	0.00	1.00	0.25 *	0.09	0.11	0.53	0.10	0.50	0.16	0.27	0.01	0.98
10 years	0.00	0.98	0.22	0.14	0.15	0.39	0.10	0.51	0.06	0.70	−0.07	0.67

Source: Authors' calculations and illustration based on Benin (2016), AG (2018), CAGD (2018), GSS (2017), Ghana Cocoa Board (2018), and World Bank (2017).
Notes: Noncocoa is all agriculture (crops, livestock, forestry, and fishery) except cocoa. GDP = gross domestic product; GTE = government total expenditure; GAE = government agriculture expenditure on the noncocoa subsector; CobExp = Cocobod expenditure on the cocoa subsector. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent level, respectively.

CONCLUSIONS AND IMPLICATIONS

This policy note analyzed the expenses of the general government sector on the noncocoa agricultural subsector (all of agriculture except cocoa) in Ghana from 1960 to 2015. This is consistent with assessing progress toward the CAADP 10 percent agriculture expenditure target in the 2003 Maputo Declaration. Even considering the noncocoa subsector's dominance in agricultural GDP (about 90 percent), as well as its substantial contribution to total GDP (about 20 percent), the share of GTE for the noncocoa agricultural subsector has declined over time, reaching only 2.5 percent per year in the CAADP era (after 2003). The noncocoa subsector's share of GTE once had been much higher, reaching 14 percent in 1977 and 1979 and then averaging 8 percent per year up until the 1990s. Today, however, government spending on the subsector is equivalent to only 1.8 percent of the noncocoa agricultural GDP. This figure is much lower than that enjoyed by the cocoa agricultural subsector—Cocobod spends an equivalent of about 30 percent of cocoa agricultural GDP on the subsector. Furthermore, the overall quality of spending has deteriorated, having shifted from the higher-return, longer-term beneficial functions such as research and extension toward lower-return functions such as general administration and

fertilizer subsidies. For example, spending on research and development in the noncocoa agricultural subsector, which had been around 0.44 percent of noncocoa agricultural GDP in most of the 2000s, dropped by one-half to 0.22 percent in recent years—moving Ghana further away from another CAADP target of the government spending 1 percent of GDP on research.

Because both the level and quality of government expenditures are important in determining GDP performance, as seen in existing evidence from Ghana and other African countries as well as correlations undertaken in this note, the low and declining levels and quality of GAE are points of concern. Although the annual average agricultural GDP growth rate of 3.4 percent in recent years (2012–2015) may seem moderate, the rate has been declining by about half a percentage point on average each year since 1960, pushing Ghana further away from achieving the CAADP 6 percent agricultural growth target. Thus, without a radical action to bolster the level of GAE and improve its quality, it is difficult to see how the declining agricultural GDP growth rate can be reversed and sustainably increased. Certainly, increasing or even doubling the share of GTE going to the noncocoa agricultural subsector (which was at only 2.5 percent per year in 2004–2015 and at less than 1 percent in 2014 and 2015) should be a feasible option. Similarly, the prospect of reallocating expenditures within the subsector to higher-return, longer-term productivity-enhancing activities such as research and development, extension, irrigation, and infrastructure cannot be ignored.

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1201 Eye Street, NW, Washington, DC 20005 USA | T. +1-202-862-5600 | F. +1-202-862-5606 | Email: ifpri@cgiar.org | http://www.ifpri.org/