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Complying with the Maputo Declaration Target

Trends in public agricultural expenditures and implications for pursuit of optimal allocation of public agricultural spending

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ReSAKSS

Contents

Contents *Continued*

List of Figures

List of Tables

List of Boxes

Abbreviations

AETS	African Union's Agricultural Expenditure Tracking Survey
AFF	Agriculture, forestry, and fishery
AFF+	Agriculture, forestry, fishery, rural development, food security programs, and emergency food aid
AFSI	L'Aquila Food Security Initiative
AgGDP	Agriculture GDP
AgPERs	Agriculture public expenditure reviews
Agriculture spending intensity	The ratio of government expenditure on agriculture to agriculture value added (by country or region)
ATOR	Annual Trends and Outlook Report
ASTI	Agricultural Science and Technology Indicators
AUC	African Union Commission
AU-NEPAD	African Union / New Partnership for Africa's Development
CAADP	Comprehensive Africa Agriculture Development Programme
CEN-SAD	Community of Sahel-Saharan States
COFOG	Classification of Functions of Government
COMESA	Common Market for Eastern and Southern Africa
DACF	District Assemblies Common Fund
DFID	UK Department for International Development
DRC	Democratic Republic of Congo
EAC	East African Community
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization
GDP	Gross domestic product
GFS	Government finance statistics
IFPRI	International Food Policy Research Institute
IGAD	Intergovernmental Authority for Development
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
IWMI	International Water Management Institute
JSR	Joint sector review
M&E	Monitoring and evaluation
MAFAP	Monitoring African Food and Agricultural Policies
MFAN	Ministry of Foreign Affairs of Netherlands
MDAs	Ministries, departments, and agencies
MoFA	Ministry of Food and Agriculture
NAIP	National agricultural investment plan
PAE	Public agricultural expenditures
PPP	Purchasing power parity
R&D	Research and development
REC	Regional Economic Community
ReSAKSS	Regional Strategic Analysis and Knowledge Support System
SADC	Southern African Development Community
SPEED	Statistics on Public Expenditure for Economic Development
Share of PAE	Ratio of PAE to total government expenditure (usually annual); the agriculture sector share in public spending
SIDA	Swedish International Development Cooperation Agency
UMA	Union du Maghreb Arabe
USAID	United States Agency for International Development
WDI	World Development Indicators

Foreword

This 2012 Africa-wide Annual Trends and Outlook Report (ATOR), the fifth issue of the series, is only the second to examine in detail a featured topic of strategic importance to the Comprehensive Africa Agriculture Development Programme (CAADP). The ATORs are designed to assess country, subregional, and Africa-wide performance against CAADP and other development goals and to provide an outlook for future performance. It is hoped that the analysis will contribute to improved policymaking, dialogue, implementation, and mutual learning processes of the CAADP implementation agenda.

This year marks CAADP's tenth anniversary following its launch in 2003. It also marks 10 years since the Maputo Declaration—when African heads of state and government pledged to allocate at least 10 percent of their national budgets to the agricultural sector. It is therefore fitting that the 2012 ATOR takes an in-depth look at trends and patterns in public agricultural expenditures (PAE), and in particular examines how countries have measured up to the Maputo Declaration.

According to the report, neither Africa as a whole nor its subregions have, on average, achieved the Maputo Declaration target, despite increases in the absolute amounts of PAE. A more telling picture emerges when countries are examined individually. For instance, since 2003, a total of 13 countries have met or surpassed the CAADP target in one or more years. Ethiopia and Madagascar (eastern Africa); Malawi, Zambia, and Zimbabwe (southern Africa); Burundi and Congo Republic (central Africa); and Burkina Faso, Ghana, Guinea, Mali, Niger, and Senegal (western Africa). No country in

northern Africa has met the target. Other countries have increased their agricultural sector spending, in absolute terms and shares, and are moving toward the target. The Maputo Declaration has clearly rallied African governments to act, albeit less than expected or required.

To better understand differences across countries, the report calls for further research that looks at how countries make their agricultural sector budget allocations: are they based, for example, on perceived expected returns and optimality of the 10 percent target, or on the relative importance of agriculture in the economy? The African Union Commission's Department of Rural Economy and Agriculture and the International Food Policy Research Institute (IFPRI) have already initiated work to address some of these issues.

The 2012 ATOR highlights the importance of the composition of agricultural spending, as different types of agricultural spending can affect agricultural growth differently. In particular, empirical evidence has shown the large and lasting contribution of agricultural research and development (R&D) to growth and poverty reduction, albeit with a long time lag. Yet, as the report finds, a majority of African countries spend far less on agricultural R&D than 1 percent of their agricultural gross domestic product. Countries spending above 2 percent tend to be middle-income countries like Botswana, Mauritius, South Africa, and Namibia; those spending between 1 and 2 percent include Burundi, Uganda, Kenya, Tunisia, Morocco, Mauritania, and Malawi. In light of the pivotal role played by agricultural R&D spending, as previously pointed out in the 2011 ATOR, there is an

urgent need for increased investments in R&D infrastructure, as well as capacity strengthening of R&D systems and better policies to enhance agricultural productivity and economic growth.

Over the last decade, issues have arisen surrounding what counts as agricultural spending, with the effect of distracting from the Maputo Declaration's call to action. Some of this has been due to the fact that a few countries have included large amounts of subsidies in their PAE. In other cases, outlays have often reflected government organizational structures instead of specific functions. Accordingly, the report calls for establishing coding and accounting systems that will capture the functions and objectives of outlays, irrespective of ministry. Better coding and accounting of agricultural spending will be particularly important for improving the review of national agriculture investment plans, as part of agricultural joint sector reviews (JSRs). In turn, this will enhance accountability between governments and their constituencies as well as their development partners.

Since agricultural trade is a strategic area for sustaining the CAADP momentum as well as an important contributor to economic growth, poverty reduction, and food security, the upcoming ATOR for 2013 will take a comprehensive look at how trade can foster these objectives in African countries. The report will also examine how trade can help build resilience, not only of the poor and vulnerable but also of food systems, to cope with and adapt to effects of climate change and of agricultural commodity price increases and volatility.

Following the adoption of the CAADP mutual accountability guidelines and the launch of JSRs in a number of countries in 2013, future issues of the ATOR will highlight progress on the JSR process in selected countries and draw lessons for enhancing mutual review and accountability processes.

Finally, as 2014 has been declared the year of Agriculture and Food Security by African heads of state and government, as well as the year when CAADP's tenth anniversary will be commemorated, a special issue of the ATOR will review progress made under the CAADP agenda and the prospects for an enhanced implementation process over the next decade.

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Acknowledgments

Executive Summary

A decade ago in 2003, a meeting of heads of state of African countries launched the Comprehensive Africa Agriculture Development Programme (CAADP), including a commitment to invest 10 percent of their total national expenditures in the agriculture sector—a commitment popularly known as the Maputo Declaration. Several efforts have been made to track and evaluate the amounts and quality of public investments in the sector, which is important for prioritizing investments to achieve their development objectives. This 2012 annual trends and outlook report (ATOR) presents patterns and trends in public agricultural expenditure (PAE) in Africa and identifies the data needs for further PAE analysis. This analysis becomes especially important as countries gear up for the joint agriculture sector reviews of their national agricultural investment plans (NAIPs) and as they work to strengthen their mutual accountability in the sector.

Major findings and recommendations

The ratio of total national expenditure to total gross domestic product (GDP) in Africa as a whole is similar to these ratios in many other regions of the world. However, the actual amounts spent are constrained by the small size of their revenue base, limiting the ability of African governments to undertake expensive, but necessary, investments to bring about substantial economic growth in the continent.

African governments on average increased their total expenditures at an average rate of 8.5 percent per year in 2003–2010, from about $10.1 billion on average per country in 2003 to $16.9 billion on average per country in 2010.[1] Expressed as a ratio of total GDP, the total amount spent is comparable to those percentages in many other regions of the world; in absolute terms, however, the levels are just too low. The amounts spent (less than $300 per capita in many parts of the continent) are constrained by the size of the revenue base of the governments: average GDP per capita in 2003–2010 was less than $2,000. This limits governments' ability to undertake expensive but necessary growth-enhancing public investments, such as research and development and rural infrastructure improvements. Therefore, African governments need to be more strategic in using their existing resources, to make targeted transfers, and to undertake the type of investments to bring about substantial economic growth in the continent. It will also be critical for African governments to leverage investments from the private sector and to explore other funding arrangements, including working closely with their development partners to secure large grants and low-interest loans.

The amount of PAE in Africa as a whole increased rapidly in 2003–2010 (7.4 percent per year on average), but as this growth rate was slower than the growth in total expenditures, the share of PAE in total expenditures declined.

In 2003–2010, the amount of PAE for Africa as a whole increased from about $0.39 billion on average per country in 2003 to $0.66 billion on average in 2010. While PAE's growth performance seems impressive, it was lower

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[1] All dollar figures are presented in current international dollars of 2005, based on purchasing power parity (PPP) exchange rates.

than the growth performance in total expenditures. Accordingly, the share of PAE in total expenditures for Africa as a whole in fact declined over the same period. Since 2003, when the declaration was made, 13 countries have surpassed the CAADP 10 percent target in any single year: Burundi, Burkina Faso, Republic of Congo, Ethiopia, Ghana, Guinea, Madagascar, Malawi, Mali, Niger, Senegal, Zambia, and Zimbabwe. However, only seven of them have surpassed the target in most years: Burkina Faso, Ethiopia, Guinea, Malawi, Mali, Niger, and Senegal. In other countries, performance vis-à-vis the CAADP 10 percent target is mixed.

Country reports on compliance with the CAADP 10 percent target have in some cases generated controversy on what to count as PAE— a distraction from discussing the fundamental issue of the specific investments needed to achieve development results.

Although the African Union has published a technical note on what to count as PAE, investments in rural infrastructure continue to generate controversy on whether they should be counted toward achievement of the CAADP 10 percent agriculture expenditure target (AU-NEPAD 2005). In Ghana, for example, the government recently started to include expenditures on feeder roads and debt servicing as part of PAE, counting these toward the 10 percent target. Aside from this accounting issue, different clusters of countries show very different trends in the share of PAE (increasing, declining, or stagnating), raising a fundamental question regarding how countries make their agricultural sector budget allocations. For example, are allocations based on expected returns and optimality of the 10 percent target, or on the relative importance of agriculture in the economy? Further research is required to comprehensively answer this question for each country. Nevertheless, given the low overall levels of total national expenditure,

compliance with the 10 percent target may still be insufficient to undertake the expensive but necessary investments to achieve stated development results, as shown for several countries by Diao et al. (2002).

Expenditures on crops and livestock dominate PAE, as compared to fishery and forestry. The distinction between current spending and investment is not consistent across countries. For agricultural research and development (R&D), most countries spend far less than the NEPAD target of 1 percent of agricultural GDP.

There are wide variations in the respective shares of PAE for current and investment expenditure, with the share on investments ranging from less than 20 percent in Seychelles, Sierra Leone, and Namibia to more than 80 percent in Senegal, Mali, and Madagascar. This reflects primarily an accounting issue: many public financial management systems count all expenditures financed by donors as investment or development spending irrespective of what they are actually spent on. Regarding agricultural R&D spending, most countries spent far less than 1 percent of agricultural GDP, the target set by NEPAD. The top performers in 2003–2010 with respect to this indicator are Botswana and Mauritius (which spent 4–5 percent), followed by South Africa and Namibia (2–3 percent), and Burundi, Uganda, Kenya, Tunisia, Morocco, Mauritania, and Malawi (slightly above the 1 percent target).

Since the mid-2000s, many countries spent a large share of PAE on subsidies and programs, which were common in African agricultural development in the 1960s and 1970s prior to the structural adjustment and market reforms era.

With the recent high food and input prices crisis, agricultural input and farm support subsidies have returned strongly to the development agenda in

Africa: many governments are once again spending a large share of their agricultural budgets on agricultural input and farm support subsidies. Indeed, many of the donors who opposed these mechanisms in the past, citing their high cost and their distortionary effect on the domestic economy, are now also providing aid in the form of farm support and agricultural subsidies. These subsidies are similar to many of the government-run programs that were abandoned in the past, thus raising the question: To what extent have these programs, which are still deemed controversial with regard to their cost-effectiveness, been adjusted to take account of those experiences prior to structural adjustment?

Different types of PAE affect agricultural growth and other development outcomes differently in different parts of the continent, with varying time lags.
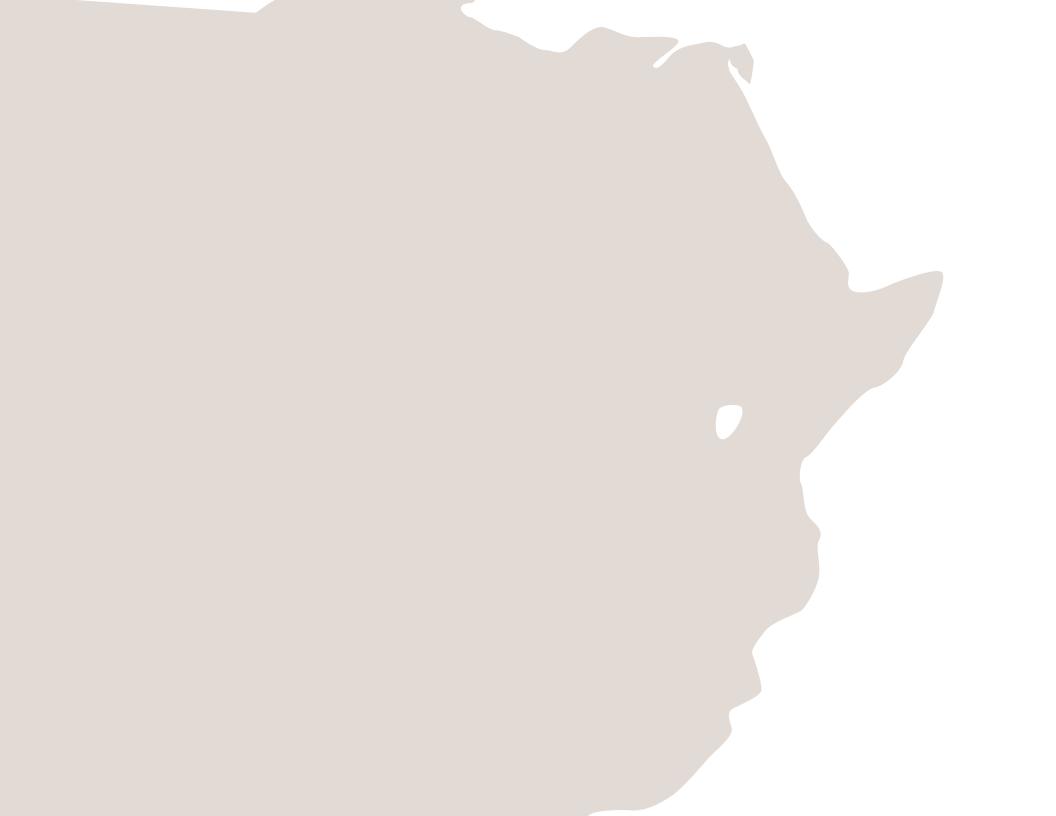
The literature and empirical evidence from specific case studies within and outside of Africa have shown that different types of PAE affect agricultural growth and other development outcomes differently, with varying time lags. Based on the available data, and using scatterplots and univariate regressions, this analysis finds only weak correlation between agricultural output growth rate and aggregate PAE growth rate. However, there is a strong correlation between agricultural output growth rate and agricultural R&D expenditure growth rate, with larger correlation coefficients and greater statistical significance for longer time frames (from investment to outcome). The estimated correlations are different for the different sub-regions in Africa.

These results suggest three observations: (1) Not all types of PAE are growth-inducing. (2) PAEs that are growth-inducing, such as agricultural R&D spending, take time to show results. (3) It will be important to identify,

prioritize, and promote different types of PAE in different areas, and to find the correct balance between PAEs that have immediate but possibly short-lived benefits and those that take time to manifest but that offer large and long-lasting economic benefits. This balance rests on the trade-offs of political and economic benefits generated by different types of PAE. Hence it is important to find innovative ways to increase the political and economic benefits associated with the critical but underinvested agricultural public goods and services.

How should governments optimally allocate PAE? To comprehensively answer this question, solid M&E data are necessary, including disaggregation of PAE data by function, at different levels and across space and time.

The optimal allocation of PAE would be based on an analysis of the efficiency and distributional effects (or equity) of different types of public spending over a meaningful time dimension, including analysis of both PAE and public nonagriculture expenditures. It is therefore critical to have public expenditure data that are disaggregated by function and across space and time. Currently, measurement of PAE according to different functions is difficult because of the form in which public accounts records are managed and reported, which generally categorize outlays by government agency rather than by the specific functions performed, the public goods and services provided, or the outcomes achieved. Investing in public accounts systems that provide these types of information, and making the data publicly available, will enhance the political accountability of governments to their citizens and promote mutual accountability of state and nonstate actors in agricultural development, key to achieving an optimal allocation of resources.

1| Introduction

n 2003, the heads of state of African countries launched the Comprehensive Africa Agriculture Development Programme (CAADP), an agriculture-led integrated framework for development that aims at reducing poverty and increasing food security through pursuing an average 6 percent annual agricultural growth rate. To stimulate the necessary acceleration in agricultural growth, the convened heads of state committed to invest 10 percent of total government expenditures in the agriculture sector—a commitment generally known as the Maputo Declaration. Ultimately it is farmers who make the on-farm investment decisions that determine agricultural growth, and indeed farmers are by far the largest investors in the sector.[2] Nevertheless, the commitment by African governments to increase the amount and improve the quality of government investment in the sector is critically important. This is because farmers' on-farm investment decisions are based on the potential profitability and risks of alternative investment opportunities both within and outside the agriculture sector, which are in turn, influenced by government spending and investment decisions.

Many strategic plans for implementing the agriculture-led integrated framework have accordingly focused on the role of governments in planning, channeling, and catalyzing investments in the sector. Efforts have also been made to track and evaluate the actual amounts and quality of government investments in the sector—essential data for projecting the types and magnitudes of public agricultural investments that would be required for countries to achieve their development objectives, as articulated in the CAADP country investment plans for example. Unfortunately, these investment prioritization exercises are hampered by the lack of disaggregated data on public agricultural expenditures and capital stocks across space and time.[3]

The overall goal of this report is to present patterns and trends in public agricultural expenditure (PAE) in Africa and to identify the data needs for further analysis of PAE, as countries gear up for the joint agriculture sector reviews to strengthen mutual accountability in the sector. This chapter presents some fundamental and conceptual issues associated with the definition and measurement of PAE. Chapter 2 presents a description of the data used, and Chapters 3 and 4 report the trends in government expenditure and

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[2] Farmers' on-farm investments make up more than three-quarters of the total investments in the agricultural sector (FAO 2012).

[3] See for example Benin, Mogues, and Fan (2012) on data requirements for estimating the impacts of PAE and Benin, Fan, and Johnson (2012) on data requirements for estimating PAE to achieve a specific development objective.

PAE. Chapter 5 examines the composition of PAE and correlations between PAE and agricultural growth across different parts of Africa. Chapter 6 provides disaggregate of PAE, lists data requirements for the joint agriculture sector reviews, and discusses the data and information needed for comprehensive PAE reviews and analyses that would be consistent with a typical CAADP national agricultural investment plan (NAIP). Chapter 7 concludes, with a summary of the main findings and overall policy implications.

The Appendixes present details of the data both for the individual countries and for the subcontinent of Africa, including five geographic regions of the African Union (central, eastern, northern, southern, and western), four economic groups (based on production potential, nonagricultural alternative sources of growth, and income level), and the eight Regional Economic Communities (RECs) (see Benin et al. 2010).[4]

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[4] These data can also be viewed at and downloaded from the ReSAKSS website (http://www.resakss.org/sites/default/files/pdfs/ReSAKSS_AgExp_2013_website.pdf).

2| Measurement of Public Agricultural Expenditures and Data Sources

Public expenditure refers to the expenditures incurred by public authorities, such as central, state, and local governments, to achieve the socioeconomic objectives of the country. Accordingly, *public agricultural expenditure* (PAE) is construed in this report as expenditures incurred by public authorities to achieve the socioeconomic objectives of the agricultural sector. Typically, PAE is measured by adding together all the parts of the government's expenditure that are related to agriculture. Thus, the way agriculture is defined, and the organization of the public sector, will have a significant influence on the measure of PAE.

Within the context of the Maputo Declaration, the African Union's New Partnership for Africa's Development (AU-NEPAD) has developed a technical note on the definition of agriculture and specifically what to count as PAE (AU-NEPAD 2005), following the framework of the Classification of Functions of Government (COFOG) (IMF 2001). Nevertheless, the amount of PAE that is reported (or expected to be reported) by governments has drawn substantial debate and controversy, in terms of what expenditures to count toward achievement of the 10 percent target.

Definition of agriculture and implications for measurement of PAE

Agriculture is commonly understood to be associated with the production of crops and livestock. A search for the definition of *agriculture* yielded various results, depending on the *products* (such as crops, forestry, animals, and fishery), the *process* of production (science, art, practice, enterprise, or investment), and the *purpose* (food, fiber, income, leisure, and so forth). The International Monetary Fund (IMF)'s COFOG includes agriculture (crops and livestock) in the same functional category as forestry, fishery, and hunting (IMF 2001). The technical note developed by AU-NEPAD for agriculture expenditure tracking defines *agricultural production* as crops, livestock, forestry, and fishery; although it is stated that it will follow IMF's COFOG, it excludes hunting (AU-NEPAD 2005). The Food and Agriculture Organization of the United Nations (FAO) recently issued its flagship report on the state of food and agriculture (FAO 2012), which defines *agriculture* as crops, livestock, aquaculture, and agroforestry—differing from the IMF and the AU-NEPAD definitions by excluding wild or captured forest and fishery resources. However, the proportion of PAE allocated to fishery and forestry is relatively very small in most countries (as shown in the next chapters), so the resulting differences in the measures of PAE, based on these varying definitions of agricultural products, are not likely to be substantial.

Much of the current controversy surrounding the measurement of PAE relates to defining the process of agricultural production. Such buzzwords as agricultural *science, art, enterprise,* and *investment* seem to imply a need for certain kinds of inputs, skills, technologies, information, licenses, financial resources, and so forth that are involved in the production process.

IMF's COFOG, for example, provides a detailed description of the various government functions that can help those involved in the production process to acquire these inputs (and skills, technologies, information, and so forth), while also regulating their operations. These government functions include administration, planning, and regulation; information generation and dissemination; provision of specialized services; subsidies; and applied research and experimental development (Box 2.1).

Two broad functions have attracted particular controversy with reference to defining PAE: *multipurpose development projects* (or projects with multisectoral objectives), such as the construction and maintenance of flood control, irrigation, and drainage systems (which, it is argued, serve nonagricultural purposes as well); and *subsidies* (which raise questions regarding the public good justification for providing them).[5]

More recently, controversy has emerged around the issue of including government expenditures on construction and maintenance of rural or feeder roads—particularly with respect to compliance with the Maputo Declaration 10 percent agriculture expenditure target—because such expenditures can also serve multisectoral objectives. The controversy derives primarily from the CAADP framework Pillar 2, which aims to increase market access through improved rural infrastructure (including road, rail, marine, and air transportation) as well as other trade-related interventions (AU-NEPAD 2003). The agriculture public expenditure reviews conducted by the World Bank, for example, now include a broader definition of PAE—referred to as "COFOG plus"—that is based on the AU-NEPAD definition plus other items (such as expenditure on feeder roads) to accommodate individual countries' own definitions of PAE (World

Bank 2013a). Similarly, though perhaps a bit more extreme, the definition adopted by FAO's Monitoring African Food and Agricultural Policies (MAFAP) project includes in PAE not only agriculture-*specific* expenditures (consistent with the AU-NEPAD definition) but also agriculture-*supportive* expenditures (including expenditures for rural development such as rural health, rural education, and rural infrastructure) (FAO 2013).

Regardless of the definition of PAE, it is agreed that such rural development projects, infrastructure, and investments do serve multisectoral purposes and are thus also beneficial to the *nonagriculture* sector in rural areas. The question is, what share of the public expenditure on such projects should be counted as PAE? IMF's COFOG excludes from PAE *any* expenditures on such multipurpose development projects (Boxes 2.1 and 2.2). However, the technical note by AU-NEPAD recommends including in PAE *all* of the initial expenditures incurred in the construction of such infrastructure, provided that at least 70 percent of the cost is justified for, or related to, the agricultural sector. (This approach assumes that splitting the construction cost among different sectors or purposes is not practical. However, after construction, administration and maintenance expenditures are expected to be easy to classify under the relevant sectors, such as irrigation, energy, and transportation, in the case of maintaining a dam.) Because public expenditures with such multisectoral objectives tend to involve very large initial outlays, classifying the whole amount under any one sector may distort analysis of intertemporal expenditure trends in that sector and also bias estimates of the sector's cost-effectiveness in attaining its socioeconomic objectives.

The measurement problem is exacerbated by the form in which the

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[5] The public good rationale for public spending is discussed in Mogues et al. (2012).

BOX 2.1—CLASSIFICATION OF FUNCTIONS OF GOVERNMENT (COFOG) FOR AGRICULTURE

7042 AGRICULTURE, FORESTRY, FISHING AND HUNTING

70421 Agriculture (crops and livestock)

– Administration of agricultural affairs and services; conservation, reclamation, or expansion of arable land; agrarian reform and land settlement; supervision and regulation of the agricultural industry

– Construction or operation of flood control, irrigation and drainage systems, including grants, loans, or subsidies for such works

– Operation or support of programs or schemes to stabilize or improve farm prices and farm incomes; operation or support of extension services or veterinary services to farmers, pest control services, crop inspection services, and crop grading services

– Production and dissemination of general information, technical documentation and statistics on agricultural affairs and services

– Compensation, grants, loans, or subsidies to farmers in connection with agricultural activities, including payments for restricting or encouraging output of a particular crop or for allowing land to remain uncultivated

Excludes: multipurpose development projects (70474)

70422 Forestry

– Administration of forestry affairs and services; conservation, extension, and rationalized exploitation of forest reserves; supervision and regulation of forest operations and issuance of tree-felling licenses

– Operation or support of reforestation work, pest and disease control, forest fire-fighting, and fire prevention services and extension services to forest operators

– Production and dissemination of general information, technical documentation, and statistics on forestry affairs and services

– Grants, loans, or subsidies to support commercial forest activities

Includes: forest crops in addition to timber

70423 Fishing and hunting

This class covers both commercial fishing and hunting, and fishing and hunting for sport.

– Administration of fishing and hunting affairs and services; protection, propagation, and rationalized exploitation of fish and wildlife stocks; supervision and regulation of freshwater fishing, coastal fishing, ocean fishing, fish farming, wildlife hunting, and issuance of fishing and hunting licenses

– Operation or support of fish hatcheries, extension services, stocking or culling activities, etc.

– Production and dissemination of general information, technical documentation, and statistics on fishing and hunting affairs and services

– Grants, loans, or subsidies to support commercial fishing and hunting activities, including the construction or operation of fish hatcheries

Excludes: control of offshore and ocean fishing (70310); administration, operation, or support of natural parks and reserves (70540)

70482 R&D Agriculture, forestry, fishing, and hunting

– Administration and operation of government agencies engaged in applied research and experimental development related to agriculture, forestry, fishing, and hunting

– Grants, loans, or subsidies to support applied research and experimental development related to agriculture, forestry, fishing, and hunting undertaken by nongovernment bodies such as research institutes and universities

Excludes: basic research (70140)

Source: IMF (2001).

available expenditure data are managed and reported. Most audited public accounts are organized in a manner that reflects the outlays associated with organizational structures of the government rather than the outlays associated with different functions. In most, if not all, countries, the functions associated with agriculture are distributed among multiple government ministries, departments, and agencies (MDAs).[6] Many of these MDAs may be responsible for dealing with other functions, such as environment, roads, education, health, or rural development (see Box 2.3 for the case of Ghana). Because each MDA in the accounting system is associated with one function only (usually the primary function of the higher-level organizational structure), expenditures undertaken by an MDA are simply classified as expenditures on that primary function. This means that nonagricultural expenditures undertaken by an agriculture-labeled MDA may be counted as PAE, while agricultural expenditures undertaken by a nonagriculture-labeled MDA may be counted as non-PAE. This challenge could be addressed by establishing a coding system within the accounting system to cross-classify all outlays by function and objective.

A third dimension of the definition of agriculture relates to its *purpose or objective*—for example, food, fiber, income, or economic gain. This dimension, too, is likely to introduce some controversy into the measurement of PAE. The recent global food price crisis resulted in several commitments on food security by developed countries, such as the L'Aquila Food Security Initiative (AFSI) in 2009 and the New Alliance for Food Security in 2012. As part of this trend, resources have been redirected away from direct support to producers and selected commodity production toward more indirect measures, such as supporting the design of incentive policies, promoting rural development more broadly (for example, through physical infrastructure), and improving social and governance structures. This has prompted proposals for broadening the classification of agricultural expenditure beyond the traditional agriculture, forestry, and fishery (or AFF), based on its *objective*, to include some aspects of rural development, food security programs, and emergency food aid (called AFF+). Even further, agricultural expenditure might be redefined to capture related expenditures

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[6] These include boards, commissions, judicial authorities, legislative bodies, executive offices, and other entities at all levels of government (central; state, provincial, or regional; and local or district).

in other sectors, such as financial policy administration and management, trade facilitation, general budget support, and road transport (GDPRD 2011). Once again, the fundamental question is: What types of public expenditure on these objectives should be counted as PAE?

Classification of public agricultural expenditures

This discussion of allocating expenditures highlights the importance of classifying PAE accurately in order to ascertain its share in total expenditure as stipulated by the Maputo Declaration. The classification of public expenditure in general refers to the systematic arrangement of all the various items on which the government incurs expenditure. While the three dimensions of the definition of agriculture (products, process, and purpose) provide obvious ways of classifying PAE, the fundamental rationale for more precisely classifying PAE derives from the fact that different types of public spending, both across and within sectors, affect different development objectives and outcomes differently, through different pathways and over different periods of time. (See, for example, Fan, Gulati, and Thorat 2008; Mogues and Benin 2012.)

A basic classification of PAE derives from the notion that public capital and private capital are complementary in the production process, so that an increase in the public capital stock in agriculture and in rural areas raises the productivity of all factors in production, which in turn leads to higher incomes and greater outcomes. However, because some types of public spending may not create any productive capital or may have weak links with productivity (Devarajan et al. 1996), the classification of PAE into productive and nonproductive expenditures is critical. This classification is also referred to as capital vs. current expenditures, investment vs. recurrent expenditures, or development vs. nondevelopment expenditures.

- *Capital* (or *investment*) expenditures are typically incurred in building durable assets that are expected to improve the productive capacity of the sector—hence, productive expenditure.
- *Current* (or *recurrent*) expenditures are consumption expenditures that are incurred year after year and do not create any productive asset, hence their classification as unproductive expenditures.
- *Development* expenditures are those that promote economic growth and development, while those that do not are termed *nondevelopment* expenditures.

The main challenge in implementing this broad classification is that the distinction is not always clear-cut, as in the case where current expenditures serve to maintain the value of capital assets. Moreover, in many governments' accounting systems, all expenditures financed by donors may be classified as investment or development expenditures—irrespective of what they are actually spent on (Arkroyd and Smith 2007).

Other principles of expenditure classification, as discussed in the preceding section, are classification by *subsector* (crops, livestock, fishery, forestry, and hunting); by *function* (general administration, research and development (R&D), extension, irrigation, and subsidies—Box 2.1); and by *development objective* (such as food security, poverty reduction, and income). In addition, classification by *sources of financing* is also important: external funding (grants or loans) vs. internal funding (taxes, fees, royalties, and so forth). This classification is important because increased government revenue and expenditure will have different development implications depending on the source. For example, raising taxes may have negative total (government and private) investment effects by crowding out private investment; or the expenditure may have undesirable poverty-deepening consequences, if PAE diverts resources that the poor must rely on. Similarly,

increased government spending financed through external grants may tend to appreciate the real foreign exchange rate, thus reducing the competitiveness of the tradable sectors and hampering economic growth. Regarding external sources, too, their lack of alignment with country strategies has increasingly become an issue of concern, as noted by the Paris Declaration and the Accra Agenda of Action on aid effectiveness.

Although public goods and services deriving from PAE are intended to confer benefits on the entire population, there may be people or groups who fail to benefit because of limited economic, physical, or social access to the public goods and services. Therefore, some PAE may be designed to target specific groups of people, such as smallholder, aged, female, or youth farmers. Similarly, different groups of people may be targeted differently in the agricultural transformation process: smallholder versus large-scale commercial farmers, farmers in different agroecological zones, farmers in rural vs. urban areas, and so forth. PAE can accordingly be classified by the specific groups of people targeted to benefit from the expenditure.

Data sources and methodology

The data used in this study to measure and classify PAE are drawn from five main sources: Statistics on Public Expenditure for Economic Development (SPEED) (Yu 2012); African Union's Agricultural Expenditure Tracking Survey (AETS) (AUC 2008); Agricultural Science and Technology Indicators (ASTI) (IFPRI 2013); Monitoring African Food and Agricultural Policies (MAFAP) database (FAO 2013); and various national sources, compiled by the ReSAKSS regional nodes and country SAKSS nodes (national sources).

First we obtained total expenditures from 1980 onward from the SPEED database. Then we compiled data on the share of PAE in total expenditure

(hereafter referred to as "share of PAE") based on available data from all the sources cited, using the more recent source in case of conflicting data. The dollar amount of PAE was then determined by multiplying the shares by total expenditures (obtained from 1980 onward, from the SPEED database). Missing values were estimated using extrapolations based on annual average growth rates in total expenditures and PAE. To adjust for inflation and to allow comparison across countries, total expenditures and PAE were converted into constant 2005 purchasing power parity (2005 international PPP dollar), using PPP conversion factors from the World Development Indicators (WDI) (World Bank 2013b). See the appendix for data tables on: total expenditures (Table A.1), PAE (Table A.2), share of PAE in percentages (Table A.3), and various disaggregations of PAE presented as percent of total PAE (Table A.4).

This report analyzes trends in PAE over the period 2003–2010 based on various classifications of PAE (to the extent the data allow), in order to assess aggregate and cross-country performance against popular benchmarks. The results are presented at an aggregate level for the entire continent (Africa) and for the five geographic regions of the African Union (central, eastern, northern, southern, and western), shown in Table 2.1. The results are also presented using other aggregations or groupings of countries, reflecting differing resource endowments and stage of development (Diao et al. 2007). Table 2.2 shows a four-category

economic development typology, based on three factors: agricultural potential, alternative (or nonagricultural) sources of growth, and income level (see Benin et al. 2010). Table 2.3 presents an aggregation based on Regional Economic Communities (RECs).

As in preceding reports, the aggregate value of an indicator is estimated using the weighted sum approach, where the weight for each country is the share of that country's value in the total value for all countries in the region (or group). This report also presents, in addition, an analysis based on the performance of the top 10 agricultural economies, as defined by their share

TABLE 2.1—COUNTRIES BY GEOGRAPHIC REGION, WITH COUNTRY'S SHARE IN REGION'S TOTAL AGRICULTURE VALUE ADDED

Central Africa (5.3)	East Africa (23.6)	North Africa (26.7)	Southern Africa (8.0)	West Africa (36.4)
Burundi (5.0)	Comoros (–)	Algeria (22.5)	Angola (21.0)	Benin (2.6)
Cameroon (35.7)	Djibouti (0.1)	Egypt (50.7)	Botswana (1.7)	Burkina Faso (3.6)
Central African Rep. (7.8)	Eritrea (–)	Libya (–)	Lesotho (0.8)	Cape Verde (0.1)
Chad (8.5)	Ethiopia (29.2)	Mauritania (1.5)	Malawi (9.4)	Cote d'Ivoire (5.3)
Congo, Dem. Rep. (37.4)	Kenya (13.7)	Morocco (18.3)	Mozambique (14.9)	Gambia, The (0.4)
Congo, Rep. (2.8)	Madagascar (5.1)	Tunisia (7.0)	Namibia (3.8)	Ghana (7.1)
Equatorial Guinea (2.6)	Mauritius (0.8)		South Africa (37.5)	Guinea (1.4)
Gabon (–)	Rwanda (3.6)		Swaziland (1.3)	Guinea Bissau (0.4)
Sao Tome & Principe (0.2)	Seychelles (0.0)		Zambia (9.6)	Liberia (0.6)
	Somalia (–)		Zimbabwe (–)	Mali (3.5)
	South Sudan (2.8)			Niger (2.4)
	Sudan (21.2)			Nigeria (67.4)
	Tanzania (15.3)			Senegal (2.2)
	Uganda (8.2)			Sierra Leone (1.3)
				Togo (1.6)

Source: Authors' calculation, based on World Bank (2013b).
Notes: Figure in parentheses is the region's percentage share in Africa's total agriculture value added, or the country's percentage share in the region's total (2003–2010 annual average). Dashes indicate data are not available. Data for South Sudan and Sudan are based on 2008–2010 values.

in Africa's total agriculture value added: Nigeria (24.5 percent), Egypt (13.5 percent), Ethiopia (6.9 percent), Algeria (6.0 percent), Sudan (5.0 percent), Morocco (4.9 percent), Tanzania (3.6 percent), Kenya (3.2 percent), South Africa (3.0 percent), and Ghana (2.6 percent).[7]

The association between PAE and agricultural growth is assessed using scatterplots and univariate regressions on different measures of the two indicators. These methods are based on a simplistic assumption: that agricultural growth rate is influenced *only* by the PAE indicator. While we recognize that various factors both within and beyond agriculture affect agricultural growth, this method provides a quantitative measure of overall association without suggesting causal relationships. Findings from other studies, based on a literature review, are examined to substantiate the results in this study.

[7] Sudan includes South Sudan because the data are not disaggregated for the two countries. Together, these ten countries account for about three-quarters of Africa's total agriculture value added in 2003–2010 (authors' calculation, based on World Bank 2013b).

TABLE 2.2—COUNTRIES BY ECONOMIC DEVELOPMENT CLASSIFICATION, WITH COUNTRY'S SHARE IN GROUP'S TOTAL AGRICULTURE VALUE ADDED

		Low income (LI)	Middle income (MI) (69.5)
More favorable agricultural conditions	Mineral rich (LI-1) (4.4)	Central African Republic (9.5)	Algeria (8.6)
		Congo, Dem. Rep. (45.4)	Angola (2.4)
		Guinea (11.9)	Botswana (0.2)
		Liberia (4.7)	Cameroon (2.7)
		Sierra Leone (10.9)	Cape Verde (0.0)
		Zambia (17.6)	Congo, Rep. (0.2)
	Nonmineral rich (LI-2) (22.0)	Benin (4.3)	Cote d'Ivoire (2.8)
		Burkina Faso (6.0)	Djibouti (0.0)
		Ethiopia (31.4)	Egypt (19.4)
		Gambia, The (0.7)	Equatorial Guinea (0.2)
		Guinea Bissau (0.7)	Gabon (–)
		Kenya (14.7)	Ghana (3.7)
		Madagascar (5.5)	Lesotho (0.1)
		Malawi (3.4)	Libya (–)
		Mozambique (5.4)	Mauritius (0.3)
		Tanzania (16.4)	Morocco (7.0)
		Togo (2.6)	Namibia (0.4)
		Uganda (8.8)	Nigeria (35.3)
		Zimbabwe (–)	Sao Tome & Principe (0.0)
Less favorable agricultural conditions (LI-3) (4.1)		Burundi (6.5)	Senegal (1.1)
		Chad (11.1)	Seychelles (0.0)
		Comoros (–)	South Africa (4.3)
		Eritrea (–)	South Sudan (1.0)
		Mali (31.0)	Sudan (7.2)
		Mauritania (9.8)	Swaziland (0.2)
		Niger (21.0)	Tunisia (2.7)
		Rwanda (20.6)	
		Somalia (–)	

Source: Authors' calculation, based on Benin et al. (2010) and World Bank (2013b).
Notes: Figure in parenthesis is the region's percentage share in Africa's total agriculture value added, or the country's share in the region's total (2003–2010 annual average). Dashes mean data are not available. Data for South Sudan and Sudan are based on 2008–2010 values.

TABLE 2.3—COUNTRIES BY REGIONAL ECONOMIC COMMUNITY (REC), WITH COUNTRY'S SHARE IN REC'S TOTAL AGRICULTURE VALUE ADDED

CEN-SAD (66.8)	COMESA (37.4)	EAC (8.2)	ECCAS (7.9)	ECOWAS (36.4)	IGAD (17.8)	SADC (15.0)	UMA (13.2)
Benin (1.4)	Burundi (0.7)	Burundi (3.3)	Angola (21.4)	Benin (2.6)	Djibouti (0.1)	Angola (11.2)	Algeria (45.6)
Burkina Faso (2.0)	Comoros (–)	Kenya (39.6)	Burundi (3.4)	Burkina Faso (3.6)	Eritrea (–)	Botswana (0.9)	Libya (–)
Central African Rep. (0.6)	Congo, Dem. Rep. (5.3)	Rwanda (10.3)	Cameroon (24.2)	Cape Verde (0.1)	Ethiopia (38.8)	Congo, Dem. Rep. (13.3)	Mauritania (3.0)
Chad (0.7)	Djibouti (0.0)	Tanzania (23.0)	Central African Rep. (5.3)	Cote d'Ivoire (5.3)	Kenya (18.2)	Lesotho (0.4)	Morocco (37.1)
Comoros (–)	Egypt (36.1)	Uganda (23.8)	Chad (5.8)	Gambia, The (0.4)	Somalia (–)	Madagascar (8.1)	Tunisia (14.3)
Cote d'Ivoire (2.9)	Eritrea (–)		Congo, Dem. Rep. (25.4)	Ghana (7.1)	South Sudan (3.7)	Malawi (5.0)	
Djibouti (0.0)	Ethiopia (18.4)		Congo, Rep. (1.9)	Guinea (1.4)	Sudan (28.2)	Mauritius (1.2)	
Egypt (20.2)	Kenya (8.6)		Equatorial Guinea (1.7)	Guinea Bissau (0.4)	Uganda (10.9)	Mozambique (8.0)	
Gambia, The (0.2)	Libya (–)		Gabon (–)	Liberia (0.6)		Namibia (2.0)	
Ghana (3.9)	Madagascar (3.3)		Rwanda (10.8)	Mali (3.5)		Seychelles (0.1)	
Guinea (0.8)	Malawi (2.0)		Sao Tome & Principe (0.1)	Niger (2.4)		South Africa (20.0)	
Guinea-Bissau (0.2)	Mauritius (0.5)			Nigeria (67.4)		Swaziland (0.7)	
Kenya (4.8)	Rwanda (2.3)			Senegal (2.2)		Tanzania (24.0)	
Liberia (0.3)	Seychelles (0.0)			Sierra Leone (1.3)		Zambia (5.1)	
Libya (–)	South Sudan (1.8)			Togo (1.6)		Zimbabwe (–)	
Mali (1.9)	Sudan (13.4)						
Mauritania (0.6)	Swaziland (0.3)						
Morocco (7.3)	Uganda (5.2)						
Niger (1.3)	Zambia (2.1)						
Nigeria (36.7)	Zimbabwe (–)						
Sao Tome & Principe (0.0)							
Senegal (1.2)							
Sierra Leone (0.7)							
Somalia (–)							
South Sudan (–)							
Sudan (8.5)							
Togo (0.9)							
Tunisia (2.8)							

Sources: Authors' calculation based on AU (2011), CEN-SAD (2011), COMESA (2010), EAC (2011), ECOWAS (2010), IGAD (2011), SADC (2010), UMA (2011), and World Bank (2013b).
Notes: CEN-SAD is the Community of Sahel-Saharan States; COMESA is the Common Market for Eastern and Southern Africa; EAC is the East African Community; ECCAS is the Economic Community of Central African States; ECOWAS is the Economic Community of West African States; IGAD is the Intergovernmental Authority for Development; SADC is the Southern Africa Development Community; and UMA is the Union du Maghreb Arabe. Figure in parentheses is the region's percentage share in Africa's total agriculture value added, or the country's share in the region's total (2003–2010 annual average). Dashes mean data are not available. Data for South Sudan and Sudan are based on 2008–2010 values.
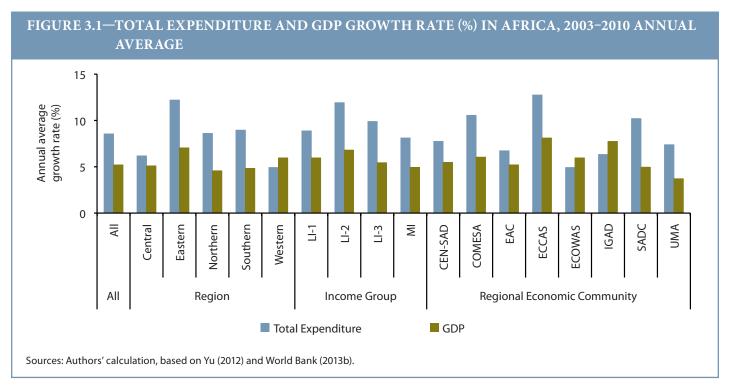
3| Trends in Total National Expenditures

Before examining the trends and patterns in PAE and results of the correlation between PAE and agricultural growth, it is useful to examine the trends in total national expenditures as a way of setting the context within which PAE takes place across different parts of Africa, considering that resources are limited overall. A comparison of trends in total expenditures in Africa to those in other development regions further sets the stage for deriving implications regarding PAE requirements for achieving development results (that is, international benchmarking) in relation to the Maputo Declaration's 10 percent agriculture expenditure target.

African governments increased their total expenditures at an average rate of 8.5 percent per year in 2003–2010 (Figure 3.1), from about $10.1 billion on average per country in 2003 to $16.9 billion in 2010 (appendix Table A.1). Total expenditure in 2003–2010 expressed as a percentage of total GDP was about one-fourth on average for Africa as whole (Figure 3.2), rising by 4 percentage points overall (from 25.4 percent in 2003 to 29.4 percent in 2010). The ratio of total government expenditure to total GDP is a good indicator for comparing countries in terms of the government's role in socioeconomic activities: larger ratios may indicate greater provision of public goods and services by the government, or greater involvement of the government in socioeconomic activities; smaller shares indicate lower provision of

FIGURE 3.1—TOTAL EXPENDITURE AND GDP GROWTH RATE (%) IN AFRICA, 2003–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012) and World Bank (2013b).
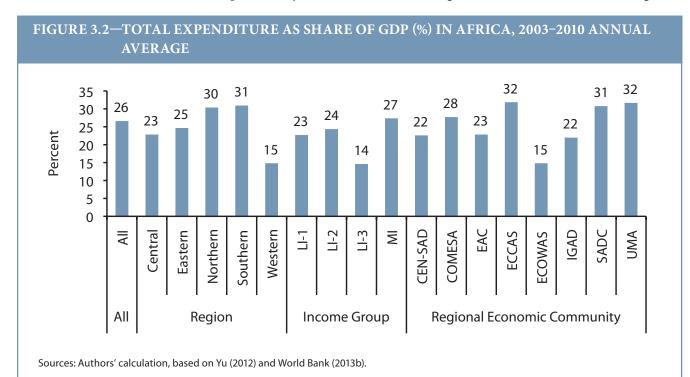
public goods and services by the government, or lower involvement in socioeconomic activities. Similar interpretations can be derived using total expenditure per capita (Figure 3.3).

However, variation in the ratio of total expenditure to total GDP across countries may in some cases indicate differences in approaches used to deliver public goods and services and to provide social protection, rather than differences in actual expenditure levels. For example, indirect government support of economic activity, via tax incentives, may result in a lower ratio than support via direct expenditures, especially if the resulting increase in GDP is greater under the indirect scenario.

The subregions of Africa show wide variation in total expenditures, whether measured in dollar amount per country (Table A.1), annual average growth rate (Figure 3.1), or percent of GDP (Figure 3.2). For 2003–2010, annual average growth rates were higher in the subregions with low initial expenditures—particularly the eastern region, the low-income groups, and the Economic Community of Central African States (ECCAS) REC. For almost all regions, total expenditures grew at a faster rate than GDP (Figure 3.1), indicating that the size of government increased over time relative to the economy. The exceptions are the western region and the Economic Community of West African States (ECOWAS) and Intergovernmental Authority for Development (IGAD) RECs, where the size of government decreased relative to the economy. For the western region and ECOWAS, annual government expenditures averaged only 15 percent of GDP—far lower than the Africa average of 26 percent, and comparable to the *low income and less favorable agriculture areas* (LI-3), at 14 percent (Figure 3.2).
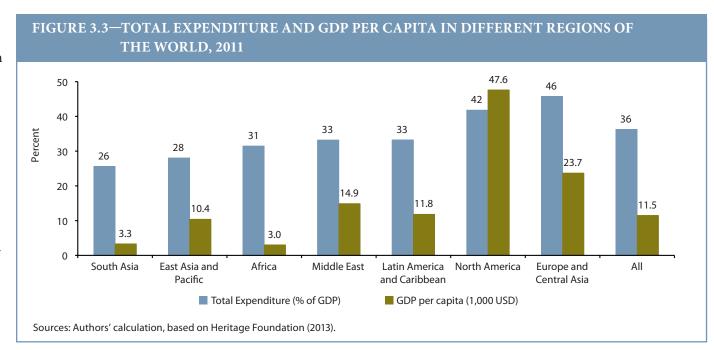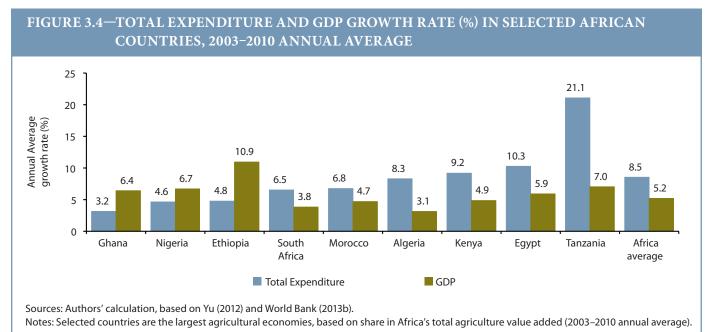
The ratio of total expenditure to total GDP in Africa is comparable to the ratios observed for other regions outside North America, Europe, and Central Asia (where the ratios are much higher: see Figure 3.3). This seems to suggest that the involvement of African governments in their economies is similar to many other regions of the world. However, the relatively low GDP per capita in Africa indicates a low revenue base (for borrowing or taxation) of African governments, which limits their ability to undertake

FIGURE 3.2—TOTAL EXPENDITURE AS SHARE OF GDP (%) IN AFRICA, 2003–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012) and World Bank (2013b).

necessary, but expensive, growth-enhancing public investments (such as research and development and road infrastructure). African governments need to be more strategic in using existing resources if they are to undertake the investments needed to bring about substantial economic growth in the continent. Leveraging funding for such investments from the private sector will be critical, as will exploring other funding arrangements, such as large grants and low-interest loans.

Ghana and Nigeria dominate the trends observed in the western region and ECOWAS. GDP grew at a faster rate than total expenditures in these two countries, with more than 6 percent annual GDP growth compared to growth in annual expenditures of 3.2 percent in Ghana and 4.6 percent in Nigeria (Figure 3.4). Ethiopia shows similar trends. At the high end of the scale of government expenditure are Kenya, Egypt, and Tanzania. Tanzania experienced exceptionally rapid

FIGURE 3.3—TOTAL EXPENDITURE AND GDP PER CAPITA IN DIFFERENT REGIONS OF THE WORLD, 2011

Sources: Authors' calculation, based on Heritage Foundation (2013).

FIGURE 3.4—TOTAL EXPENDITURE AND GDP GROWTH RATE (%) IN SELECTED AFRICAN COUNTRIES, 2003−2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012) and World Bank (2013b).
Notes: Selected countries are the largest agricultural economies, based on share in Africa's total agriculture value added (2003–2010 annual average).

growth in total expenditures, at 21.1 percent per year, primarily because its initial expenditure amount was the lowest in the group (appendix Table A.1).
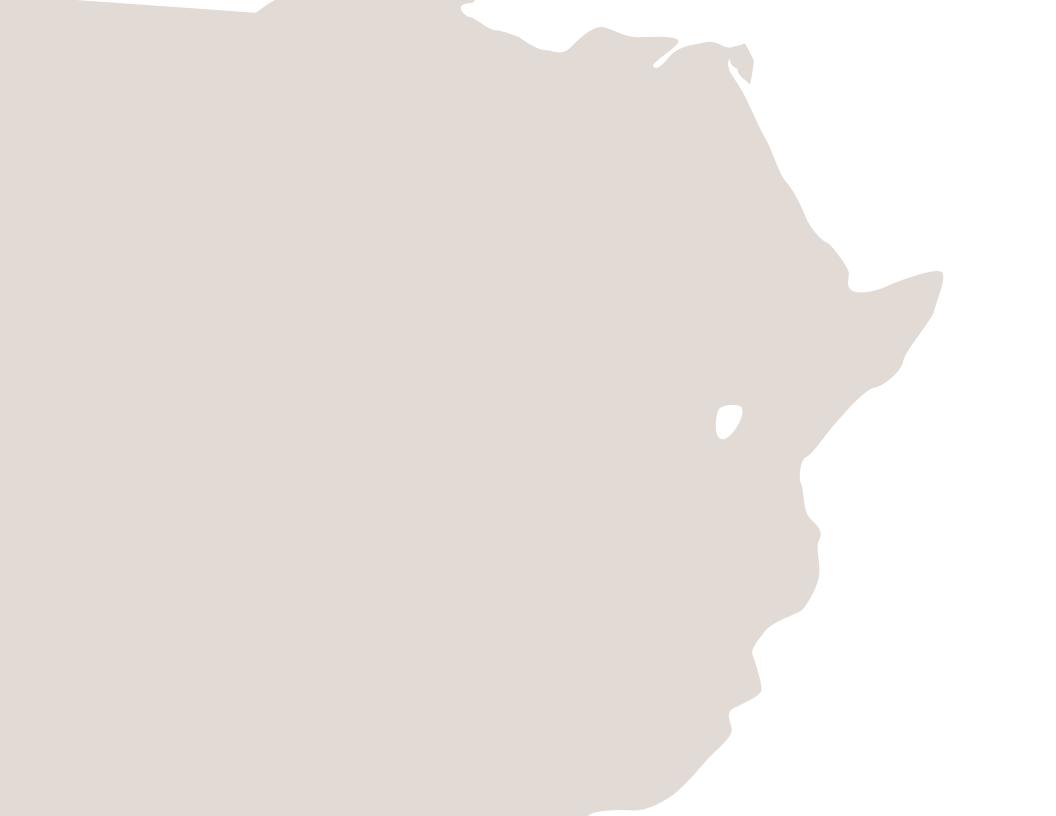
Despite the moderate to rapid growth in total expenditures across different parts of Africa, the actual amounts spent reflect the limited revenue base of governments. Annual average (2003–2010) total expenditure per capita is less than $2,000 for all the subregions; this is also true for the countries representing the largest agricultural economies, except Algeria and South Africa (Figures 3.5 and 3.6). Annual average total expenditure per capita was the lowest in the low-income areas, particularly the *low-income, more favorable,* and *mineral-rich* (LI-1) group.

In general, the low GDP per capita (less than $2,000) and low total expenditures per capita (less than $300) in many parts of the continent are accepted as the status quo, reflecting the lack of resources to undertake the necessary growth-enhancing public investments to accelerate growth. With low levels of income combined with low growth in incomes, it is argued that the revenue-generating base for governments is inadequate to fund growth-enhancing investments. However, the continent is rich in natural and mineral resources of all kinds. It is estimated that, between 1970 and 2008, Africa lost up to $1.8 trillion through mining contracts that transferred the rights to valuable national resources to multinational companies

FIGURE 3.5—TOTAL EXPENDITURE AND GDP PER CAPITA IN AFRICA (THOUSAND 2005 PPP$), 2003–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012) and World Bank (2013b).
Notes: Selected countries are largest agricultural economies based on share in Africa's total agriculture value added (2003–2010 annual average).

and gave rise to illicit financial flows (Morgan 2013). The sums lost in this way exceeded the amount of development aid Africa received, the foreign direct investments made in Africa, or Africa's external liabilities (Boyce and Ndikumana 2012). This is one of the biggest challenges facing Africa, and it requires coordinated policy action at all levels (national, regional, continental, and global) to address illicit financial flows; see Morgan (2013) on some of the actions already underway. At the same time, it is critical to improve the capacity of African countries and their governments to negotiate better trade deals and to collect taxes.

FIGURE 3.6—TOTAL EXPENDITURE AND GDP PER CAPITA IN SELECTED AFRICAN COUNTRIES, 2003–2010 ANNUAL AVERAGE

Total expenditure per capita ('000 2005 PPP$)　GDP per capita ('000 2005 PPP$)　Total Expenditure (% of GDP)

Sources: Authors' calculation, based on Yu (2012) and World Bank (2013b).
Notes: Selected countries are largest agricultural economies based on share in Africa's total agriculture value added (2003–2010 annual average).

4| Trends in Aggregate Public Agricultural Expenditures

Growth of PAE
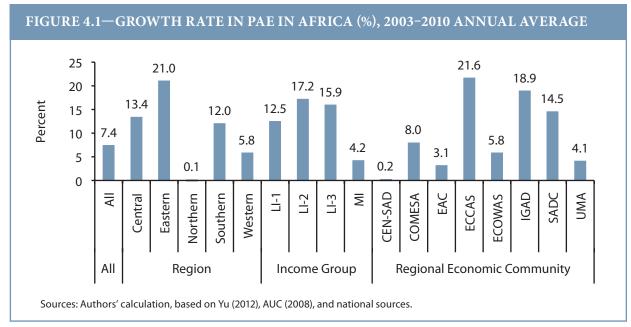
During 2003–2010, the amount of PAE for Africa as a whole increased by an average rate of 7.4 percent per year (Figure 4.1), going from a country average of about $0.39 billion in 2003 to $0.66 billion in 2010 (appendix Table A.1). While this growth in PAE seems impressive, it was lower than the growth rate of total government expenditures, estimated at about 8.5 percent per year over the same period (Figure 3.1). This suggests that the share of PAE in total expenditures for Africa as a whole has declined over this period. Moreover, while total expenditures have increased at a fairly even rate across the continent (Figure 3.1), growth in PAE has varied substantially in different parts of the continent (Figure 4.1). In particular, PAE has grown the fastest in the eastern and central Africa regions, in the low-income countries, and in the ECCAS, IGAD, and the SADC RECs, whether compared to PAE growth in other regions or to growth in total expenditure in its own region. The relatively high PAE growth in these regions reflects the low initial amounts of PAE (appendix Table A.2).

Meeting the Maputo Declaration target

Although the share of PAE in total expenditures for Africa as a whole declined over 2003–2010, in many parts of Africa the absolute levels of PAE have increased faster since the advent of CAADP in 2003 (Benin 2012). In the same period, however, none of the subregions achieved the Maputo Declaration target of spending 10 percent of total expenditure on the agriculture sector (Figure 4.2). The top performers were the eastern region (7.7 percent) and

FIGURE 4.1—GROWTH RATE IN PAE IN AFRICA (%), 2003–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
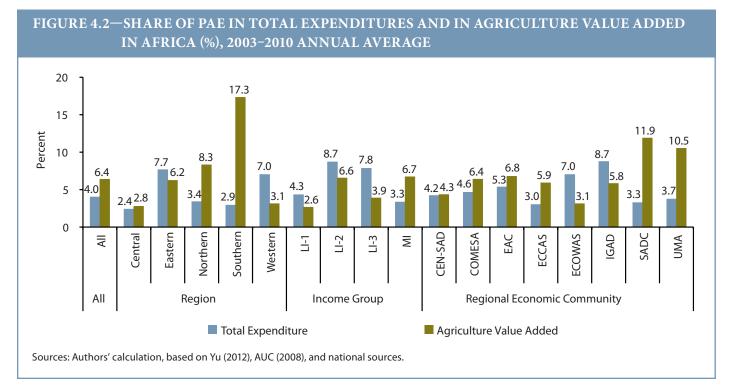
western region (7 percent), the low-income and nonmineral-rich groups LI-2 (8.7 percent) and LI-3 (7.8 percent), and ECOWAS (7 percent) and IGAD (8.7 percent).

There are substantial differences among countries. Since 2003, when the declaration was made, only 13 countries—Burundi, Burkina Faso, Republic of Congo, Ethiopia, Ghana, Guinea, Madagascar, Malawi, Mali, Niger, Senegal, Zambia, and Zimbabwe—have surpassed the CAADP 10 percent target in any year; only seven of them—Burkina Faso, Ethiopia, Guinea, Malawi, Mali, Niger, and Senegal—have consistently surpassed the target in most years (Figure 4.3). Even among the latter group, Burkina Faso and Niger are now hovering around the 10 percent threshold, having reduced the share of PAE. Possibly those
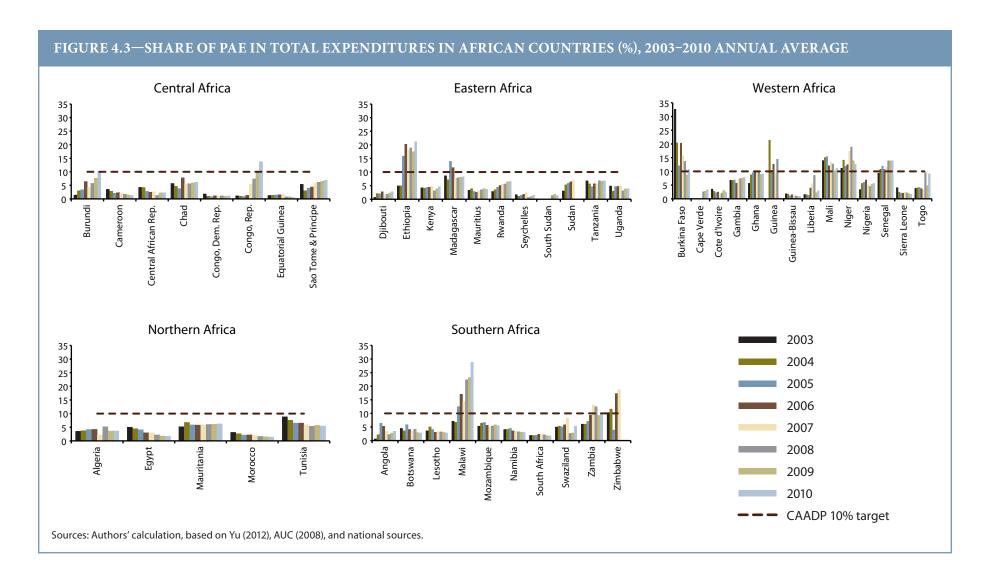
countries cut back to below the 10 percent level as representing the optimal level of agricultural expenditure (irrespective of actual returns), or they may have concluded that they are not getting the expected returns from the additional expenditures. Further investigation is needed to explore this question. Several countries show a consistent increase in share of PAE over time: this group includes Burundi, Republic of Congo, São Tomé and Principe, Rwanda, Sudan, Togo, and Zambia. In the remaining countries, the expenditure shares have generally declined or stagnated.

CAADP has clearly contributed to raising the profile of agriculture in the development agenda. Particularly in West Africa, where implementation of CAADP is most advanced, more countries have met the target or are moving in that direction. All 15 countries in the West Africa subregion have signed a CAADP compact and have a national agricultural investment plan in place.

In northern Africa, where progress in implementing CAADP has been slowest, most countries have not met the 10 percent target. As middle-income countries with significant nonagricultural sources of growth and development, it is possible that those governments are concentrating on sectors with larger political or social returns. Further investigation is needed to test this hypothesis.

FIGURE 4.2—SHARE OF PAE IN TOTAL EXPENDITURES AND IN AGRICULTURE VALUE ADDED IN AFRICA (%), 2003–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

FIGURE 4.3—SHARE OF PAE IN TOTAL EXPENDITURES IN AFRICAN COUNTRIES (%), 2003−2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

In southern Africa, with many middle-income countries, many governments spend an average of 5–10 percent of the total national budget on the agriculture sector. In fact, as a share of total expenditure, the subregion as a whole spends more on the sector than any other subregion in the continent (Figure 4.3). Malawi stands out in particular, spending far more than 10 percent of the national budget on agriculture since the start of its farm subsidy program, and particularly since 2005. In most of the other southern African countries, however, the share of PAE in total expenditures has stagnated over time. Is this because they have reached an equilibrium where the returns to additional spending in agriculture and nonagriculture are equal?
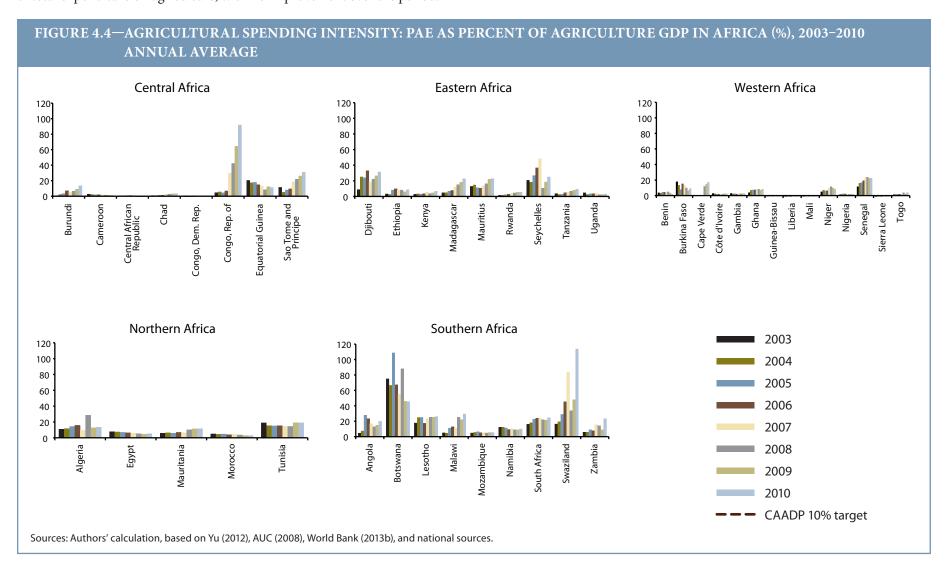
This question, too, needs further investigation.

Against the CAADP 10 percent agriculture expenditure target, the central Africa region seems to have made the most progress overall. Nevertheless, half of the countries covered here spent less than 5 percent of total expenditure on agriculture, with no improvement over the period.

In the other countries, however—particularly Burundi, Republic of Congo, and São Tomé and Principe—the share of PAE rose significantly over time (Figure 4.3). In eastern Africa, most countries spent between 5 and 10 percent of total expenditure on agriculture, and that share increased over time.

FIGURE 4.4—AGRICULTURAL SPENDING INTENSITY: PAE AS PERCENT OF AGRICULTURE GDP IN AFRICA (%), 2003–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on Yu (2012), AUC (2008), World Bank (2013b), and national sources.

Agriculture spending intensity (ratio of PAE to agriculture GDP)
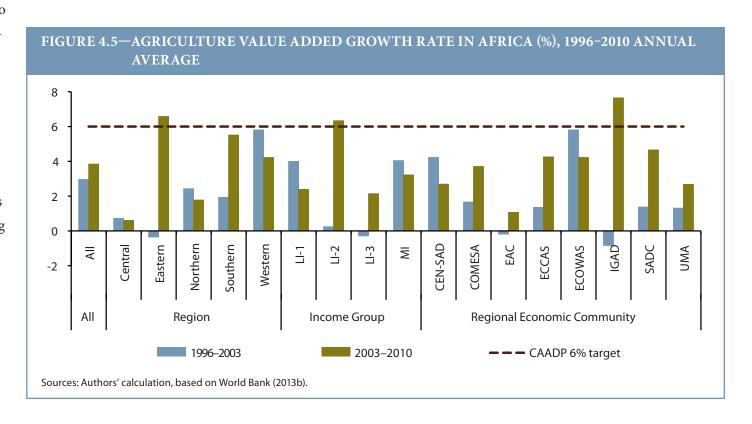
Agriculture spending intensity—a ratio of agriculture expenditures to agriculture value added (agricultural GDP)—is an indicator that better reflects country commitment, relative to the size of the sector, than the share of PAE in total government expenditure. Agriculture spending intensity has improved in Africa as a whole and in all subregions except northern Africa (Benin 2012). As Figure 4.2 shows, performance in spending intensity is generally higher than performance in the share of PAE; the exceptions are the East and West Africa regions, the low-income groups, and the ECOWAS and IGAD RECs. For Africa as a whole, average 2003–2010 spending intensity was 6.4 percent, compared to 4 percent share of PAE. The subregions with the highest average spending intensity are southern Africa (17.3 percent), northern Africa (8.3 percent), the SADC (11.9 percent), and the Union du Maghreb Arabe (UMA) (10.5 percent). The geographic regions with the lowest average spending intensity are the Central and West Africa regions, at 2.8 and 3.1 percent respectively, as can be seen at the country level in Figure 4.4.

Aggregate PAE and overall agriculture sector growth rate performance

How have the levels and changes in PAE achievements contributed to the overall performance of the agriculture sector? More specifically, how has the Maputo Declaration expenditure target (10 percent PAE) contributed to achieving the CAADP sector growth rate target of 6 percent (Figure 4.5)? A full treatment of these questions would require sophisticated econometric and economic analysis that is outside the scope of this report (for more detail see, for example, Benin, Mogues, and Fan 2012).
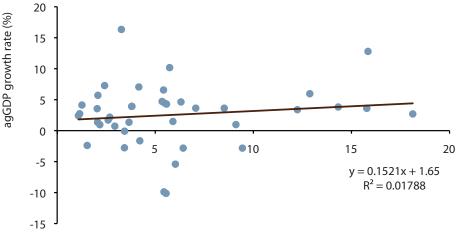
This study presents the association between annual average agricultural value added (agGDP) growth rate and aggregate PAE (by both PAE share of

FIGURE 4.5—AGRICULTURE VALUE ADDED GROWTH RATE IN AFRICA (%), 1996–2010 ANNUAL AVERAGE

Sources: Authors' calculation, based on World Bank (2013b).

expenditure and PAE growth rate), using scatter-plots and univariate regressions (Figures 4.6a and 4.6b). The overall results show only an insignificant positive correlation between these two indicators; only the East Africa region shows a strong positive correlation, while the other regions show mostly insignificant or negative correlations (Table 4.1). However, because of the small number of observations for some of the regions, their results are not reliable. The strong positive correlation between agricultural growth and share of PAE in the East Africa region is consistent with earlier findings on the region: East Africa is the strongest performer in average PAE growth rate at 21 percent (Figure 4.1) as well as one of the top performers in share of PAE in total expenditures at 7.7 percent (Figure 4.2), and it achieved the 6 percent growth rate target in 2003–2010 (Figure 4.5).[8]
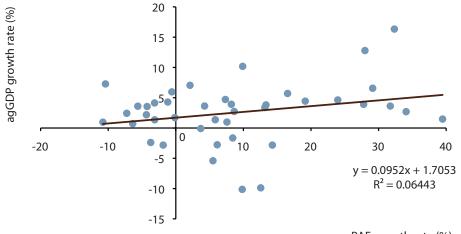
Some earlier studies used more sophisticated methods to estimate the impact of aggregate PAE on various development outcomes: for example, Fan, Yu, and Saurkar (2008) and Benin, Mogues, and Fan (2012). Those studies show that aggregate PAE has a statistically significant positive effect on

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[8] This pattern is also observed in the analysis for the LI-2 income group and the IGAD REC, because the same countries dominate both groups: Ethiopia, Kenya, Sudan, and Tanzania (Tables 2.4, 2.5, and 2.6).

FIGURE 4.6a—SCATTERPLOT OF ANNUAL AVERAGE AGRICULTURAL VALUE ADDED (AGGDP) GROWTH RATE IN RELATION TO SHARE OF PAE

y = 0.1521x + 1.65
R² = 0.01788

PAE (% of total expenditures)

FIGURE 4.6b—SCATTERPLOT OF ANNUAL AVERAGE AGRICULTURAL VALUE ADDED (AGGDP) GROWTH RATE IN RELATION TO GROWTH OF PAE

y = 0.0952x + 1.7053
R² = 0.06443

PAE growth rate (%)

Sources: Authors' calculation, based on Yu (2012), AUC (2008), World Bank (2013b), and national sources.
Notes: Plot is based on 41 countries that have data on all indicators, using 2003–2010 annual average values. The equations are estimates for the fitted lines: where y is agGDP growth rate and x is PAE; and R2 is the statistical significance of the fitted line.

agricultural output and productivity (Table 4.2 shows a sample of estimated parameters).[9] The impact of PAE is expected to reach beyond the sector, through forward and backward linkages between agriculture and other sectors (Diao et al. 2007). However, studies that assessed the effectiveness of aggregate PAE on outcomes beyond agriculture show mixed results. For example, Easterly and Rebelo (1993) and Milbourne et al. (2003) find that aggregate PAE has a statistically insignificant effect on overall economic growth, whereas Mosley, Hudson, and Verschoor (2004) find that aggregate PAE has a statistically significant positive effect on reducing poverty (Table 4.2). The mixed findings on the effect of aggregate PAE on broader

development outcomes are commonly attributed to the weak link between aggregate PAE and agricultural performance, as the link between agricultural performance and broader development outcomes has commonly been found to be strong (Diao et al. 2007; Mogues et al. 2012). Therefore, the recommendation has been to focus on the composition of PAE, because the individual components of PAE are not growth-neutral and some types of PAE may not be productive at all (Deverajan et al. 2006)—so that estimating the impact of PAE using aggregate PAE data likely neutralizes the effects of the different components. The next section discusses the composition of PAE, as well as the trends and correlations with agricultural growth.

TABLE 4.1—UNIVARIATE REGRESSION RESULTS OF AGRICULTURAL VALUE ADDED GROWTH RATE ON PAE

Region	Share of PAE in total expenditure (%)		PAE growth rate (%)	
	Estimated coefficient	R-squared	Estimated coefficient	R-squared
Central	-1.91	0.49	-0.06	0.03
East	0.84	0.50	0.24	0.38
North	-1.79	0.71	-0.07	0.01
Southern	-0.25	0.04	0.23	0.24
West	-0.04	0.01	-0.04	0.08
All[†]	0.15	0.02	0.09	0.06

Sources: Authors' calculation, based on Yu (2012), AUC (2008), World Bank (2013b), and national sources.
Notes: Dependent variable is agricultural value added growth rate (%). Estimation is based on 41 countries that have data on all indicators, using 2003–2010 annual average values.
[†]See Figure 4.6 for graphic representation.

TABLE 4.2—EXAMPLES FROM EARLIER STUDIES OF ESTIMATED ELASTICITIES OF AGGREGATE PUBLIC AGRICULTURE EXPENDITURE (PAE) ON AGRICULTURAL OUTPUT AND OTHER OUTCOMES

Outcome indicator	Elasticity	Source/Country
GDP per capita	-0.34 – -0.23[a]	Easterly and Rebelo (1993) (125 countries, including 46 from Africa)
GDP	0.01 – 0.02	Fan, Yu, and Sakaur (2008) (44 Developing countries, including 17 from Africa)
GDP	0.03 – 0.06	Fan, Yu, and Sakaur (2008) (17 African countries)
$1 per day poverty head count ratio	-0.43	Mosley, Hudson, and Verschoor (2004) (34 countries, including 16 from Africa)
Agricultural output	0.04 – 0.08	Fan, Yu, and Sakaur (2008) (44 Developing countries, including 17 from Africa)
Agricultural output per capita	0.22 – 0.38	Benin et al. (2012) (Ghana)

Notes: Elasticity is the percentage change in dependent variable caused by a 1 percent change in the value of aggregate PAE. Where a range of values is given, it represents the low- and high-end estimates associated with different estimators used in the study. GDP = gross domestic product.
[a] The elasticity is not statistically significant.

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[9] See Mogues et al. (2012) for a recent review of the empirical evidence of the impacts of public investment in and for agriculture on various development outcomes.

5| Composition of Public Agricultural Expenditures

Since the Maputo Declaration, the issue of what to count as PAE has continuously been debated. The African Union issued a note for the purpose of tracking PAE (AU/NEPAD 2005), but while it provides clear guidelines for the subsectors of crops, livestock, forestry, and fishery, the note allows varying interpretations when it comes to what expenditures to count particularly toward the Maputo Declaration 10 percent target regarding expenditures on natural resource management, flood and irrigation control systems, and feeder roads, among other investments that serve multiple purposes or objectives or whose benefits cut across multiple sectors.

Many governments, and their development partners, have launched agriculture public expenditure reviews (agPERs) in order to assess the levels and composition of PAE over time, and to measure the progress toward the Maputo Declaration target, in view of their commitment to CAADP. In general, the AgPERs show that PAE is greater than previously reported, with greater underreporting for earlier years. This raises the question, to what extent do the trends presented in this study reflect changes in actual expenditures rather than changes in accounting? Answering this question requires examining the composition of PAE, a daunting task in view of the variation in accounting and reporting systems used by different countries.

Most of the countries have adopted the COFOG methodology (IMF 2001) such that the outlays are associated with organizational structures of governments (ministries, departments, and agencies—MDAs), generating public expenditure data at that level of aggregation. (Box 2.3 presents a summary of MDAs in Ghana, highlighting the agricultural relevance of certain nonagriculture MDAs.) The outlays are not associated with specific functions (such as research, extension, irrigation, or subsidies) or with specific objectives (such as productivity increase, food security, or poverty reduction). Therefore, the functional analysis of PAE depends on the association of MDAs with specific functions. Chapter 6 focuses on Kenya's public expenditure accounting and reporting system, which has a detailed coding system, to show the significance of these issues. The following text examines the composition of PAE over time in different countries and the influence of the Maputo Declaration, starting with the case of Ghana.

Accounting of PAE: The case of Ghana

Prior to the Ministry of Finance and Economic Planning's report on compliance with the 2003 Maputo Declaration (MOFEP 2010; Send-Ghana 2010), it was widely known that Ghana spent only about 2 percent of its total expenditure on the agriculture sector in the 1990s (Arkroyd and Smith 2007;

World Bank 2008). As Table 5.1 shows, Ghana now spends far more than that on the agriculture sector: since 2005, the share of PAE in total expenditures has hovered around the CAADP 10 percent target. The shares reported for 2000 and 2001 are much lower, at 1.4 and 1.5 percent respectively, because they do not include some large expenditure items such as spending on the cocoa sector and debt servicing, for which data are unavailable. In 2009, expenditures associated with the Millennium Challenge Account, District Assemblies Common Fund (DACF), and feeder roads were also included as part of PAE. While adding these items may be justified to the extent that they are agriculture-related expenditures, their omission from the preceding years' expenditures means that PAE is not comparable over time.[10]

If such omitted expenditures are imputed and added retroactively to the expenditures in the years for which they are missing, especially considering that agriculture-related expenditures in other MDAs may not have been accounted for, it seems likely that PAE in Ghana is higher than reported in Table 5.1 for the years prior to 2009—both in absolute value and as a share of total national expenditure or agriculture GDP. By extension, not only in Ghana but also in many other African countries with similar experiences, it is arguable that PAE might have surpassed the CAADP 10 percent target for the past several years, and possibly even prior to the advent of CAADP in 2003. When expenditures on feeder roads and debt servicing are not considered, the share of PAE averages 7.7 percent for the period 2003–2009, well below the CAADP 10 percent target (Table 5.1).

The significance of this accounting issue becomes critical when assessing the cost-effectiveness of PAE, and especially for determining the baseline for the assessment. For example, the available data suggest that the share of PAE in total national expenditure was much higher in the 1980s than in the periods afterward (Table 5.2), giving the impression that the share of PAE has severely contracted over time. During the 1980s, however, governments were directly involved in agriculture production, cooperatives, and marketing boards, in addition to providing services to farmers. Direct involvement in agriculture production by governments was abandoned during the structural adjustment era, as state enterprises were privatized.

The reorientation of the role of the state in agriculture production and marketing thus drastically reduced government agriculture expenditures. Interestingly, over the past decade there appears to be a new form of direct governmental involvement in agricultural production and marketing—similar to the situation in the 1980s and 1990s, but without the direct hiring of agricultural workers or marketing boards. In the case of Ghana, for example, the government has four major subsidy programs that consume a large proportion of MOFA's budget: fertilizer, agricultural mechanization, block farming and youth in employment, and buffer stock. These programs provide inputs as well as a form of insurance to farmers, implicitly contracting with farmers to provide labor (particularly on the block farms) and with the private sector to provide stocking and managerial services (for the fertilizer, AMSEC, and NAFCO programs) (MOFA 2010; Benin et al. 2013).[11] Malawi and Zambia, like many other countries, also spend a large share of PAE on agricultural subsidies, which are still controversial with regard to their cost-effectiveness and efficiency. A question that arises is the extent to which such programs have been refurbished, to take account of the negative experiences with similar programs that were implemented prior to the structural adjustment era.

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[10] The Millennium Challenge Account was launched in Ghana in 2006, and DACF was introduced in 1993, while expenditures on feeder roads go farther back in time.

[11] Insurance is implied because of the government's low credit repayment rate.

TABLE 5.1—PUBLIC AGRICULTURE EXPENDITURES IN GHANA, 2000–2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Figures in boldface denote millions of Ghana cedis.	*Figures in italics denote % of total expenditures.*	Figures in normal font denote % of agriculture value added.								
Agriculture sector as a whole	**9.1**	**13.8**	**51.9**	**62.7**	**91.2**	**241.6**	**368.6**	**393.7**	**392.2**	**781.4**
Agriculture sector as a whole	*1.4*	*1.5*	*6.8*	*5.7*	*8.8*	*9.6*	*10.3*	*9.9*	*10.2*	*9.0*
Agriculture sector as a whole	0.9	1.0	3.0	2.6	3.0	6.6	6.8	6.2	4.4	6.9
Crops and livestock (MoFA)	**5.2**	**6.3**	**8.2**	**11.0**	**14.1**	**42.4**	**75.0**	**77.6**	**155.3**	**338.6***
Crops and livestock (MoFA)	*0.8*	*0.7*	*1.1*	*1.0*	*1.4*	*1.7*	*2.1*	*2.0*	*4.0*	*3.9**
Crops and livestock (MoFA)	0.5	0.5	0.5	0.5	0.5	1.2	1.4	1.2	1.8	3.0*
Cocoa	**n.e.**	**n.e.**	**16.4**	**20.0**	**27.5**	**93.9**	**148.7**	**112.9**	**57.6**	**169.2**
Cocoa	*n.e.*	*n.e.*	*2.2*	*1.8*	*2.7*	*3.7*	*4.2*	*2.8*	*1.5*	*2.0*
Cocoa	n.e.	n.e.	1.0	0.8	0.9	2.6	2.7	1.8	0.6	1.5
Forestry	**1.1**	**1.0**	**2.1**	**4.0**	**6.7**	**10.5**	**15.5**	**25.9**	**34.2**	**67.8**
Forestry	*0.2*	*0.1*	*0.3*	*0.4*	*0.7*	*0.4*	*0.4*	*0.7*	*0.9*	*0.8*
Forestry	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.6
Fisheries	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**6.5**	**4.2**	**5.0**	**18.0**	**14.6**
Fisheries	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*0.3*	*0.1*	*0.1*	*0.5*	*0.2*
Fisheries	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.1	0.1	0.2	0.1
Research (CSIR)[†]	**2.8**	**6.5**	**10.2**	**13.0**	**22.1**	**29.1**	**67.2**	**94.2**	**56.5**	**93.3**
Research (CSIR)[†]	*0.4*	*0.7*	*1.3*	*1.2*	*2.1*	*1.2*	*1.9*	*2.4*	*1.5*	*1.1*
Research (CSIR)[†]	0.3	0.5	0.6	0.5	0.7	0.8	1.2	1.5	0.6	0.8
PSI[‡]	**n.e.**	**n.e.**	**n.e.**	**2.8**	**6.4**	**13.7**	**15.7**	**30.9**	**2.2**	**0.7**
PSI[‡]	*n.e.*	*n.e.*	*n.e.*	*0.3*	*0.6*	*0.5*	*0.4*	*0.8*	*0.1*	*0.0*
PSI[‡]	n.e.	n.e.	n.e.	0.1	0.2	0.4	0.3	0.5	0.0	0.0
Feeder roads	**n.e.**	**n.e.**	**n.e.**	**n.e.**	**n.e.**	**n.e.**	**n.e.**	**n.e.**	**n.e.**	**91.7**
Feeder roads	*n.e.*	*n.e.*	*n.e.*	*n.e.*	*n.e.*	*n.e.*	*n.e.*	*n.e.*	*n.e.*	*1.1*
Feeder roads	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	0.8
Debt servicing	**n.e.**	**n.e.**	**15.0**	**11.9**	**14.3**	**45.4**	**42.3**	**47.2**	**68.4**	**5.5**
Debt servicing	*n.e.*	*n.e.*	*2.0*	*1.1*	*1.4*	*1.8*	*1.2*	*1.2*	*1.8*	*0.1*
Debt servicing	n.e.	n.e.	0.9	0.5	0.5	1.2	0.8	0.7	0.8	0.0
Total (all sectors)	**665.8**	**905.4**	**760.1**	**1,102.9**	**1,031.8**	**2,515.9**	**3,570.0**	**3,964.3**	**3,842.8**	**8,659.3**

Source: MOFEP (2010), Send-Ghana (2010), and World Bank (2012).

* Includes Millennium Challenge Account and District Assemblies Common Fund expenditure.

[†] As an institute, CSIR includes a secretariat/head office and nine agricultural and four nonagricultural institutes, of which the head office accounts for 11% of the total CSIR expenditures and the nonagricultural institutes account for 17% (Kolavalli et al. 2010).

[‡] PSI is presidential special initiative, which began in 2003.

n.a. = not applicable. Fisheries, prior to 2005, were under MoFA and were included in the line item for crops and livestock.

n.e. = not estimated. Data were unavailable, expenditure unknown, or data were not included as agriculture expenditure at the time.

TABLE 5.2—PUBLIC AGRICULTURE EXPENDITURES IN SELECTED AFRICAN COUNTRIES, 1980−2000

Country	Percent of total national expenditure					Percent of total agriculture value added				
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
Botswana	9.7	9.8	6.5	6.0	4.2	14.7	6.4	4.9	4.4	2.7
Egypt	4.4	4.2	5.4	5.0	6.8	18.3	20.0	19.4	16.8	16.7
Ethiopia	6.9	9.9	6.9	9.1	10.4	n.e.	57.8	54.3	57.5	49.9
Ghana	12.2	6.2	6.1	5.1	3.2	57.9	44.9	44.8	38.8	35.3
Kenya	8.4	10.4	6.0	5.5	6.8	32.6	32.6	29.5	31.1	32.4
Malawi	10.2	8.4	11.1	11.1	8.8	43.7	42.9	45.0	30.4	39.5
Morocco	6.5	5.0	5.0	4.2	3.5	18.5	16.4	18.3	15.1	14.9
Tunisia	14.5	8.3	8.5	8.3	9.3	14.1	15.8	15.7	11.4	12.3
Uganda	32.5	3.9	2.2	2.9	2.6	72.0	52.7	56.6	49.4	29.6
Zambia	13.4	10.7	5.6	2.5	2.1	15.1	14.6	20.6	18.4	22.3
Zimbabwe	7.0	10.9	11.0	4.2	1.8	15.7	22.7	16.5	15.2	18.5

Source: Authors' calculation, based on Yu (2012).
n.e. = not estimated. Data on agriculture value added were not available to calculate the share.

PAE by subsector

Figure 5.1 shows that expenditures on crops and livestock dominate PAE. The share of PAE on forestry is higher in the central and eastern African countries—particularly Central African Republic, Republic of Congo, Democratic Republic of Congo, and Uganda—which is not surprising, given the dominance of forests in those areas. The share of PAE on fisheries is higher in the island countries and countries with large coastlines, particularly Madagascar, Namibia, São Tomé and Principe, and Seychelles. (Page 34 examines how the share of PAE correlates with overall sector growth.)
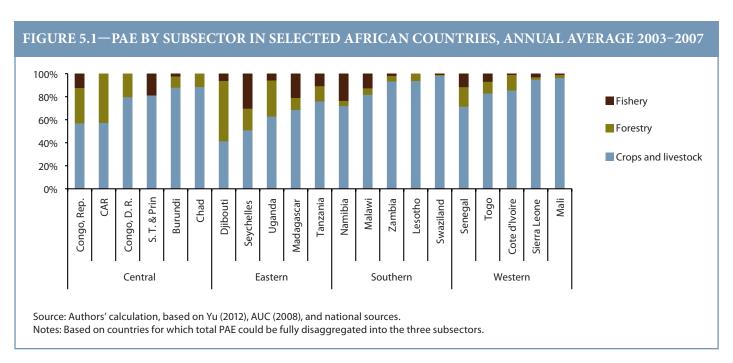
PAE by current and investment spending
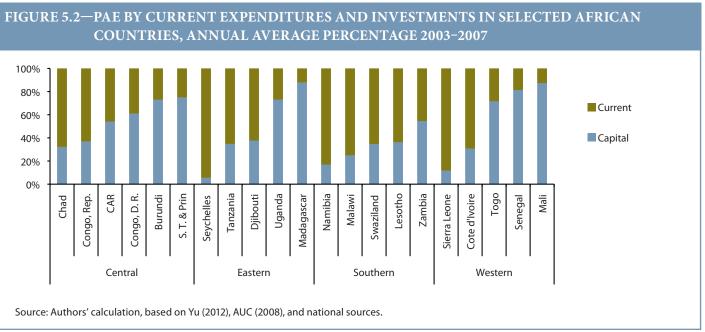
As Figure 5.2 shows, there is wide variation in the annual average share of PAE for current expenditures and investments. The share on investments ranges from around 10 percent in Seychelles (6 percent), Sierra Leone (12 percent), and Namibia (17 percent) to more than 80 percent in Senegal (81 percent), Mali (87 percent), and Madagascar (88 percent). The wide variation observed in the shares across different countries could be an artifact of the way countries classify current expenditures and investments. In many governments' accounting systems, all of the expenditures financed by

donors are classified as investment or development spending, irrespective of what they are actually spent on (Arkroyd and Smith 2007). In the Ghana case study presented earlier, expenditures on the government's four major subsidy programs are counted as investments (fertilizer subsidy, agricultural mechanization, block farming and youth in employment, and buffer stock). (Page 34 examines how the shares on current expenditures versus investments correlate with overall growth in sector.)
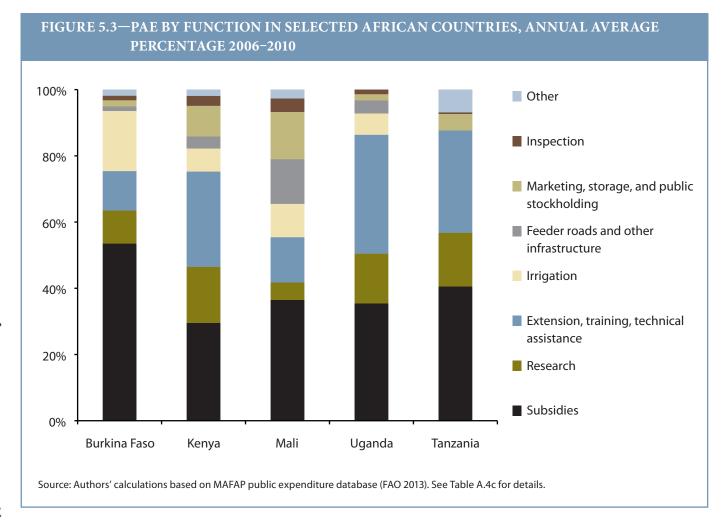
PAE by function

The analysis of levels of PAE by function draws on the MAFAP database on public expenditures, which is available for five countries: Burkina Faso, Kenya, Mali, Uganda, and Tanzania (FAO 2013). Figure 5.3 shows that a large share of annual PAE was spent on subsidies, ranging from

FIGURE 5.1—PAE BY SUBSECTOR IN SELECTED AFRICAN COUNTRIES, ANNUAL AVERAGE 2003−2007

Source: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Based on countries for which total PAE could be fully disaggregated into the three subsectors.

FIGURE 5.2—PAE BY CURRENT EXPENDITURES AND INVESTMENTS IN SELECTED AFRICAN COUNTRIES, ANNUAL AVERAGE PERCENTAGE 2003−2007

Source: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

30 percent on average in Kenya to 54 percent in Burkina Faso. For extension services, training, and other technical assistance, the share of PAE ranged from a low of 12–13 percent in Burkina Faso and Mali to 30–36 percent in the other countries. The share of PAE spent on research was moderate, at about 10–15 percent, although it was relatively low in Mali, at about 5 percent. The share of PAE spent on irrigation averaged 6–10 percent, but was much higher in Burkina Faso, at 18 percent. Overall, the functional distribution of PAE seems to be more balanced in Mali compared to the other four countries: the expenditures on subsidies, extension, and research together accounted for 75–88 percent of PAE

FIGURE 5.3—PAE BY FUNCTION IN SELECTED AFRICAN COUNTRIES, ANNUAL AVERAGE PERCENTAGE 2006−2010

Source: Authors' calculations based on MAFAP public expenditure database (FAO 2013). See Table A.4c for details.

in the other four countries, compared to only 55 percent in Mali.

Expenditures on research and development

Because of the inherently risky nature of agricultural production and marketing, farmers need technologies that are appropriate and profitable for their local production and market environments. Thus, one of the most important public goods in the sector—and a critical component of PAE—is

agricultural research and development (R&D). Several studies relating to PAE have therefore focused on the returns on investments in agricultural R&D. (See reviews by Alston et al. 2000, Evenson 2001, and Mogues et al. 2012.) AU-NEPAD has set a target for spending on agricultural R&D of at least 1 percent of agricultural GDP.

This study examines trends and performance in agricultural R&D expenditures using data from ASTI database (IFPRI 2013). Figure 5.4a shows

that South Africa, Nigeria, Morocco, and Tanzania
had the highest expenditures on agricultural R&D
in terms of the amount spent, followed by Ethiopia,
Uganda, Tunisia, Ghana, Tanzania, and Sudan.
Together, this group of 10 countries accounted for
about 80 percent of the total PAE on agricultural
R&D among the 33 countries analyzed. Comparing
the amounts spent to the NEPAD target, countries
in the West Africa region have the lowest shares of
PAE allocated to agricultural R&D, while those in
the northern and southern Africa regions have the
highest shares.

Most countries spent far less than the
AU-NEPAD target (1 percent of agricultural GDP).
The top performers against this benchmark are
Botswana and Mauritius (at 4–5 percent), followed
by South Africa and Namibia (2–3 percent) and
Burundi, Uganda, Kenya, Tunisia, Morocco,
Mauritania, and Malawi (slightly above the 1 percent
target). The other large agricultural economies
covered spent less than 0.7 percent (Nigeria, Sudan,
Ethiopia, Tanzania, and Ghana). Many countries
that spent less than the 1 percent target actually
spent more in 1996–2003 than in 2003–2008
(Burkina Faso, Gambia, Guinea, Mali, Niger,
Mozambique, Rwanda, Togo, and Zambia).

FIGURE 5.4a—PAE ON AGRICULTURAL RESEARCH AND DEVELOPMENT IN SELECTED AFRICAN COUNTRIES, 1996–2008 (MILLION 2005 PPP$)
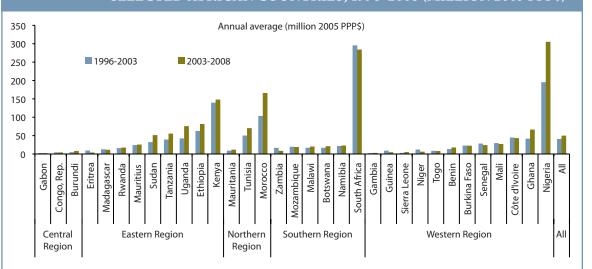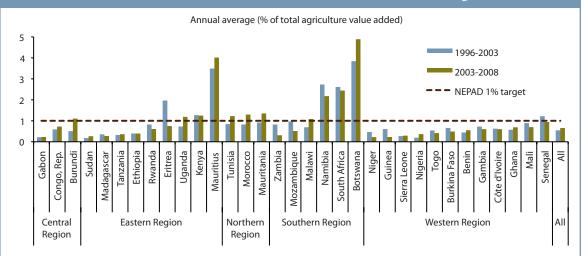
FIGURE 5.4b—PAE ON AGRICULTURAL RESEARCH AND DEVELOPMENT IN SELECTED AFRICAN COUNTRIES, 1996–2008 (% of agGDP)

Sources: Authors' calculation, based on Yu (2012), AUC (2008), World Bank (2013b), and national sources.
Notes: Plot is based on 41 countries that have data on all indicators, using 2003–2010 annual average values. The equations are estimates for the fitted lines: where y is agGDP growth rate and x is PAE; and R2 is the statistical significance of the fitted line.

Composition of PAE and overall agriculture growth rate performance

This section uses scatterplots and simple univariate regressions to estimate the correlation between overall agricultural growth and specific components of PAE: investments vs. current spending (Figure 5.5 and Table 5.3), subsectors (Figure 5.5 and Table 5.3), and agricultural R&D (Figures 5.6 and 5.7). The simple models as estimated here reveal three nested facts. First, the correlations are weak when the data for all the countries are pooled in a single estimation (Figures 5.5 and 5.6). This derives from the fact that the positive correlations in several countries cancel out the negative correlations in other countries (see Table 5.3 and Figure 5.7), indicating that the effects of PAE on agricultural growth are not the same everywhere. Finally, within a single set of countries, different correlations are observed for different components of PAE, indicating that different components of PAE have different effects on agricultural growth.

An analysis of the share of PAE spent on different agricultural subsectors shows different effects for different subregions. Whereas the share spent on crops and livestock showed a positive correlation with agricultural growth rate for the countries in the West Africa region, that correlation was negative for the countries in the central and southern Africa regions. Conversely, whereas the share spent on forestry showed a positive correlation with agricultural growth rate for the countries in the central and East Africa regions, that correlation was negative for the countries in West Africa. The correlation for the share spent on fisheries was positive for the countries in southern Africa but negative for the countries in East and West Africa.

For agricultural R&D spending, the analysis upholds the common knowledge that such expenditures and investments take time to manifest: significant positive correlation with agricultural growth is seen only after a long time lag. Countries in the West Africa region showed a positive correlation, with a three-year lag between agricultural R&D spending and agricultural growth. The countries in eastern and southern Africa showed mixed results, with mostly insignificant correlations between agricultural growth rate and agricultural R&D spending (see Figure 5.7).[12]
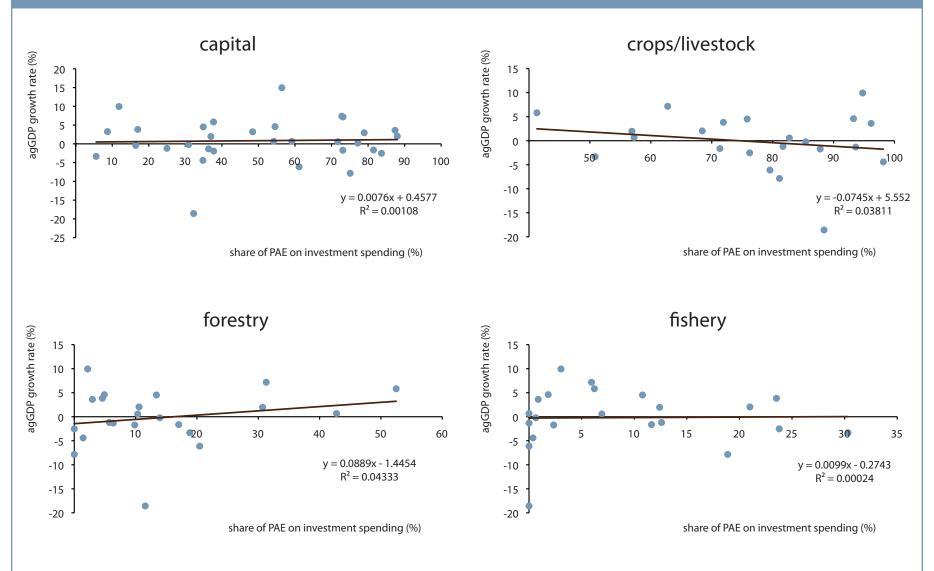
Some earlier studies used more sophisticated methods to estimate the impact of different components of PAE on agricultural growth and other outcomes, and found, similarly, that different components have different effects that are not the same in every location (see Table 5.4 for a sample of the estimated effects).[13] In Ghana, Benin et al. (2012) found higher agricultural output elasticities for capital expenditure than for current expenditure, which reflects the low capital-to-recurrent ratio in agricultural spending in that country. Studies that analyzed the effect of PAE by function found that spending on agricultural R&D resulted in greater agricultural productivity gains than spending on any other function. There are also intertemporal differences in the effects of different components. For example, Fan, Gulati, and Thorat (2008) demonstrated that the gains in agricultural production from subsidy spending decline much faster than the gains from investment in infrastructure and human capital.

The results obtained here, in addition to the findings from other studies, show the importance of identifying, prioritizing, and promoting different investments for different areas, and especially finding balance

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[12] The regressions for central and North Africa were not estimated because there were only three countries in each of the two regions that had data.

[13] See also Mogues et al. (2012) for a recent review of the evidence.

FIGURE 5.5—SCATTERPLOT OF ANNUAL AVERAGE AGRICULTURAL VALUE ADDED (agGDP) GROWTH RATE AND SHARE OF PAE ON VARIOUS AGRICULTURE SUBSECTORS

capital

y = 0.0076x + 0.4577
R² = 0.00108

share of PAE on investment spending (%)

crops/livestock

y = -0.0745x + 5.552
R² = 0.03811

share of PAE on investment spending (%)

forestry

y = 0.0889x - 1.4454
R² = 0.04333

share of PAE on investment spending (%)

fishery

y = 0.0099x - 0.2743
R² = 0.00024

share of PAE on investment spending (%)

Source: Authors' calculation, based on Yu (2012).
Notes: Based on data from 2003 to 2007 for 22 African countries, using annual average values of the indicators. Equations are estimates for the fitted lines: y is agGDP growth rate and x is share of PAE on investments or subsector; and R2 is the statistical significance of the fitted line.

between investments that have immediate (but possibly short-lived) benefits and more substantial investments that may take a long time to produce potentially large economic benefits. This balance rests on the trade-offs of political and economic benefits generated by different types of PAE. Hence it is important to find innovative ways to increase the political and economic benefits associated with agricultural public goods and services that are critical for long-term economic development but are usually underinvested.

TABLE 5.3—UNIVARIATE REGRESSION RESULTS OF AGRICULTURAL VALUE ADDED GROWTH RATE ON SHARE OF PAE ON AGRICULTURE SUBSECTORS, BY REGION

| Region | INVESTMENTS | | SUBSECTOR | | | | | |
| | | | CROPS AND LIVESTOCK | | FORESTRY | | FISHERY | |
	Estimated coefficient	R-squared	Estimated coefficient	R-squared	Estimated coefficient	R-squared	Estimated coefficient	R-squared
Central	0.11	0.07	-0.37	0.51	0.28	0.34	0.15	0.03
East	0.10	0.22	0.04	0.02	0.12	0.24	-0.38	0.96
North	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
Southern	0.04	0.03	-0.18	0.25	0.80	0.16	0.17	0.20
West	-0.05	0.24	0.36	0.61	-0.62	0.78	-0.44	0.20
All[†]	0.01	0.00	-0.07	0.04	0.09	0.04	0.01	0.00

Sources: Authors' calculation, based on Yu (2012), AUC (2008), World Bank (2013b), and national sources.
Notes: Dependent variable is agricultural value added growth rate (%).
Based on data from 2003 to 2007 for 22 African countries using annual average values of the indicators.
n.e. = not estimated. There were only three countries with data and so the regression was not estimated.
[†] See Figure 5.5 for graphic representation.
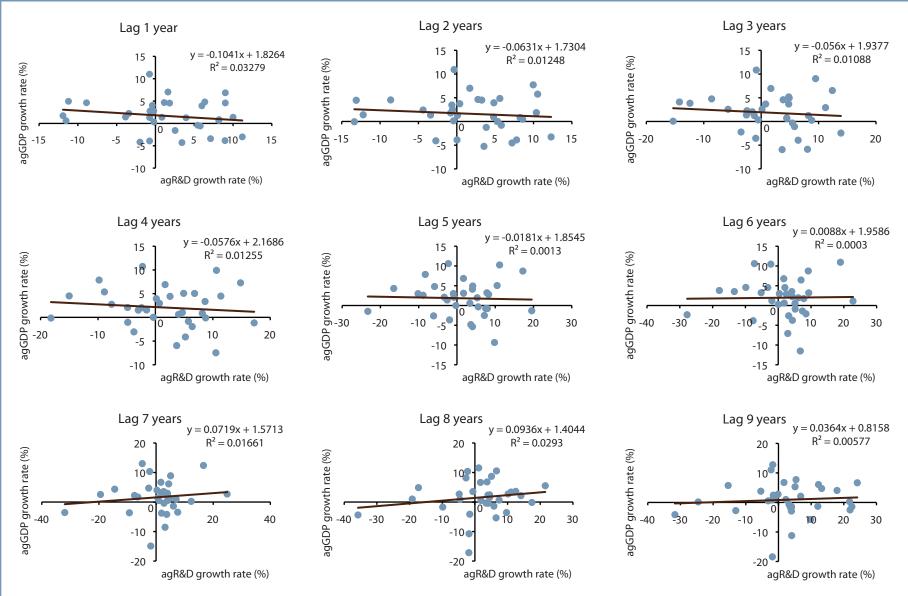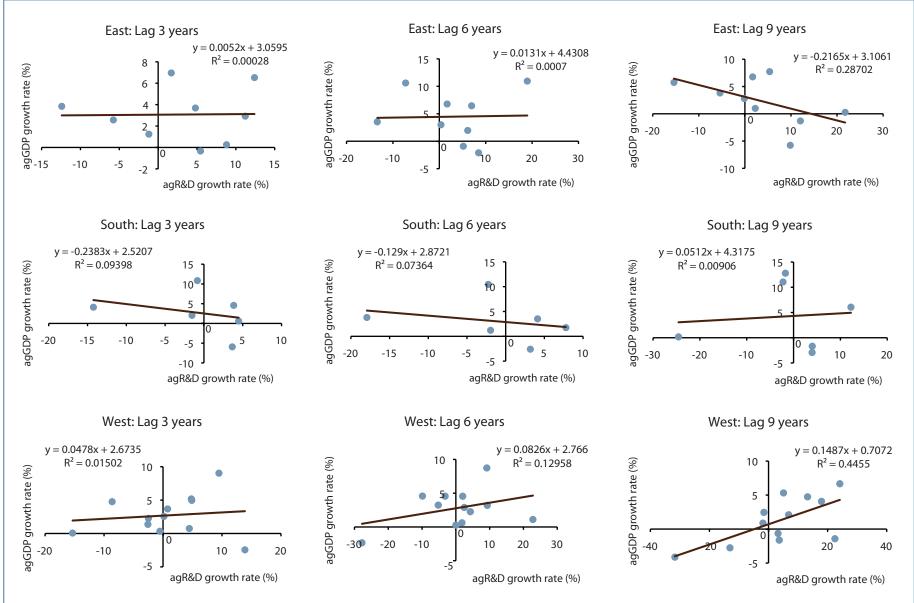
FIGURE 5.6—SCATTERPLOT OF ANNUAL AVERAGE AGRICULTURAL VALUE ADDED (agGDP) GROWTH RATE AND AGRICULTURAL R&D EXPENDITURE GROWTH RATE

Source: Authors' calculation based on IFPRI (2013).

Notes: Based on data from 1996 to 2008 for 33 African countries using annual average values of the indicators. Equations are estimates for the fitted lines: y is agGDP growth rate and x is agR&Dexp growth rate; and R2 is the statistical significance of the fitted line. Lag n years mean number of years assumed for effect, i.e. end year of agR&Dexp reduced by n and start year of agGDP reduced by n.

FIGURE 5.7—SCATTERPLOT OF ANNUAL AVERAGE AGRICULTURAL VALUE ADDED (agGDP) GROWTH RATE AND AGRICULTURAL R&D EXPENDITURE GROWTH RATE BY REGION

Source: Authors' calculation, based on IFPRI (2013).
Notes: Based on data from 1996 to 2008 for 33 African countries using annual average values of the indicators. Equations are estimates for the fitted lines: y is agGDP growth rate and x is agR&Dexp growth rate; and R2 is the statistical significance of the fitted line. Lag n years mean number of years assumed for effect, i.e., end year of agR&Dexp reduced by n and start year of agGDP reduced by n.
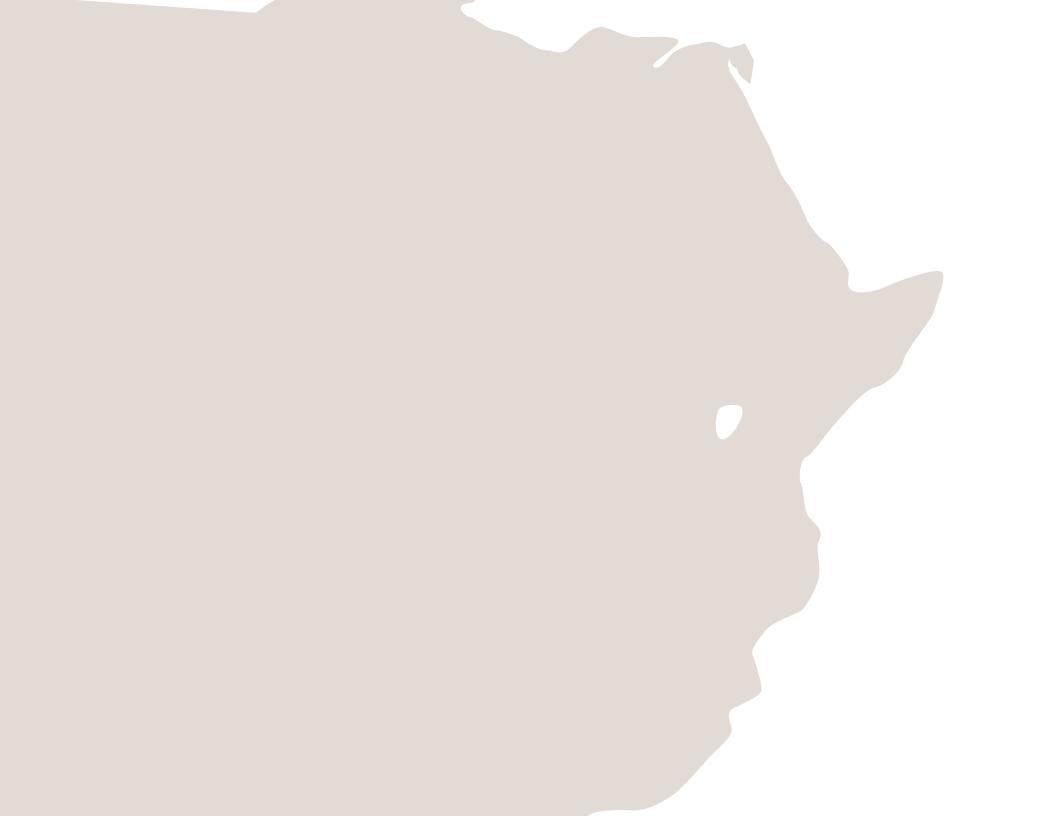
TABLE 5.4—EXAMPLES OF ESTIMATED ELASTICITIES OF DIFFERENT COMPONENTS OF PUBLIC AGRICULTURE EXPENDITURE (PAE) ON AGRICULTURAL PRODUCTION AND PRODUCTIVITY

PAE component	Dependent variable	Elasticity	Source/Country/Remarks
Recurrent versus investments			
Ghana			
Total expenditure	Ag output per capita	0.22 – 0.38	Benin et al. (2012)
Development expenditure		0.25 – 0.48	
Different functions in same location			
Developing countries			
Research	Ag output	0.038	
Nonresearch	Ag output	-0.070	Fan, Yu, and Saukar (2008a) (44 developing countries, including 17 from Africa)
China			
Research	Ag GDP per capita	0.085	Fan, Zhang, and Zhang (2002)
Irrigation	Ag GDP per capita	0.101	
India			
Research	TFP	0.255	Fan, Hazell, and Thorat (2000)
Irrigation	TFP	0.036	
Soil and water conservation	TFP	0.002[a]	
Similar function in different locations			
Research and development			
Uganda	Ag output per capita	0.189	Fan, Zhang, and Rao (2004)
Thailand	Ag output per worker	0.464	Fan, Yu, and Jitsuchon (2008)
India	TFP	0.049–0.066	Rosegrant and Evenson (1995)
Sub-Saharan Africa	Ag GDP per hectare	0.363	Thirtle, Lin, and Piesse (2003)
Asia		0.344	
Latin America		0.197	
Sub-Saharan Africa	Ag GDP per capita	0.264	Thirtle, Lin, and Piesse (2003)
Asia		0.231	
Latin America		0.093	
Irrigation			
Philippines	TFP	0.003	Teurel and Kuroda (2005)
Thailand	Ag output per worker	0.099[a]	Fan, Yu, and Jitsuchon (2008)

Notes: Elasticity is the percentage change in dependent variable caused by a 1 percent change in the value of aggregate PAE. Where a range of values is given, it represents the low- and high-end estimates associated with different estimators used in the study. Ag = agriculture. GDP = gross domestic product. TFP = total factor productivity.

[a] The elasticity is not statistically significant

6| Looking Forward to the Joint Agriculture Sector Reviews: *PAE Data Requirements for Review of Progress in Implementing the CAADP NAIPs*

Since the advent of CAADP in 2003, the demand for inclusive stakeholder participation in setting policy and investment priorities in the agriculture sector has increased, in conjunction with increased demand for mutual accountability in the sector.[14] These demands have resulted in the preparation of national agricultural investment plans (NAIPs) in 26 countries (NPCA 2013). Now countries are gearing up to strengthen their mutual accountability processes: implementation of joint sector reviews (JSRs), as forums for performance assessment, budget, and policy guidance; and including a broad spectrum of stakeholders to get insights into and influence policies and priorities for the development of the sector (CAADP MA-M&E JAG 2012).[15] The results presented in this report show clearly that the success of the JSRs in making informed decisions about public investment priorities in the agriculture sector will depend on having disaggregated data on public agricultural expenditures and capital stocks—disaggregated data that are currently lacking in many countries. This constraint needs to be addressed in order to properly review progress in implementing the CAADP NAIPs

and applying lessons learned. Successful implementation will stimulate and sustain the necessary acceleration in agricultural growth that will in turn reduce poverty and increase food and nutrition security, across the continent's subregions and sociodemographic groups.

This chapter reviews 19 of the NAIPs, in order to identify what PAE data are required to review progress in financing the NAIPs (including assessing the extent to which partners and stakeholders have managed to meet their financial commitments).[16] The analysis presents various classifications, or disaggregations, of PAE that are consistent with the NAIPs, based on decomposition analysis of the budgets stated in the NAIPs. The PAE classification frameworks are as follows: objectives and programs, subsector and commodities, current spending and investments, functions, beneficiary, sources of financing, and implementations agencies.

Finally, some challenges are discussed in relation to obtaining the different types of data, along with suggestions on how they may be overcome within the short-to-medium- and medium-to-long-term horizons.

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[14] *Mutual accountability* means that stakeholders take accountability and responsibility for their own actions within the framework of collective action.

[15] The JSRs are consistent with Mutual Accountability Framework (MAF) for CAADP (NPCA 2011).

[16] The NAIPs reviewed are for Burundi in Central Africa; Ethiopia, Kenya, Rwanda, Tanzania, and Uganda in East Africa; Malawi in southern Africa; and Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo in West Africa. See appendix Table A.5 for details on the plans, duration, and total budgets.

Required classification or disaggregation of PAE

Disaggregation of PAE by objectives and programs

This classification is important for assessing allocations and progress in financing the major priorities of the agricultural sector, generally defined as three to six areas in which agriculture is expected to contribute to broader national development results. A review of the NAIPs shows that most countries have similar sets of objectives for the sector, including improving food and nutrition security and emergency preparedness; increasing productivity, growth, or incomes; increasing competitiveness and promoting market development; improving natural resource management; applying science and technology; and promoting an enabling environment.

Different countries prioritize these shared objectives differently, however, as seen in the differences in the shares of the total budget allocated to the objectives in each individual country. These differences, arguably, reflect

TABLE 6.1—BUDGET ALLOCATION (PERCENT OF TOTAL NAIP BUDGET) TO TOP THREE PROGRAM AREAS IN SELECTED COUNTRIES

Region/Subregion	Food and nutrition security and emergency preparedness	Productivity, growth, or income	Competitiveness, markets trade, and private sector development	Natural resource management (such as land, water, climate)	Science and technology	Enabling environment (Policies, institutions, good governance)	Other
Benin, 2010–2015	44.7	51.9		2.7			0.7
Burkina Faso, 2011–2015		67.9	17.7			11.9	2.5
Burundi, 2012–2017		55.9	19.0			20.1	4.9
Cote d'Ivoire, 2010–2015		41.8	14.9			24.3	43.3
Ethiopia, 2010–2020	17.1	3.4		57.4			22.1
Gambia, 2011–2015	15.2		30.3	27.9			26.6
Ghana, 2011–2015	36.9	55.7			3.4		4.0
Kenya, 2010–2015		36.0	13.1	42.0			8.9
Liberia, 2011–2015	39.9		32.6			14.4	13.0
Malawi, 2011–2014	46.9			36.6	6.2		10.4
Niger, 2010–2012				34.4		12.6	53.0
Nigeria, 2011–2014		35.5	12.7	40.9			10.8
Rwanda, 2009–2012		77.7	15.1			4.9	2.3
Senegal, 2011–2015		59.4		31.0			9.6
Sierra Leone, 2010–2014	33.7	17.3	23.6				25.4
Tanzania, 2012–2016		71.1		13.7		7.8	7.4
Togo, 2010–2015		66.1			9.0	15.3	9.6
Uganda, 2011–2015		68.6	25.0			4.2	2.2

Source: Authors' calculation, based on national agricultural investment plans (NAIPs).
Notes: Based on amounts allocated to the top three programs, in terms of share of total budget allocated.

differences between countries in climate, resource endowment, and agricultural potential. Table 6.1 shows the top three priority areas for different countries in terms of the proportion of the total budget allocated. Increasing agricultural productivity, growth, or incomes represents a dominant objective in many countries; however, in Ethiopia, Gambia, Liberia, Malawi, Niger, and Sierra Leone, food and nutrition security or natural resource management are given higher priority. Obtaining PAE data that are disaggregated by objectives is made difficult by the interwoven and overlapping goals among many of the programs. In the NAIPs, each major priority area is subdivided into several components, typically according to subsector and functional classifications rather than objectives, as discussed in the following subsections.

Disaggregation of PAE by subsector and commodities

A standard and regular reporting output, in many countries, classifies PAE according to the CAADP-agreed subsectors (crops, livestock, fishery, and forestry) as well as certain strategic commodities (particularly those that

earn significant foreign exchange for the government). However, the review of the NAIPs showed weak justification for this type of PAE classification. Of the 19 NAIPS reviewed, only seven showed allocation of the budget by subsector; in those cases, the bulk of the total NAIP budget is allocated to crops (Table 6.2). In four of these seven countries, the forestry subsector was not mentioned in their plans or there was no specific budget allocation to forestry. Although all of the NAIPs identified specific commodities and commodity groups that are expected to lead overall agricultural growth and development, only six of the NAIPs showed specific budgetary allocations to commodities, with maize and rice being common strategic crops (Table 6.3).

The classification of PAE by subsector (and by key commodities) is important as it allows assessment of PAE allocation in relation to the level of contribution of specific subsectors and commodities in agricultural GDP, in turn allowing recommendations on how PAE may be reallocated to bring about greater growth. Of course, assessing progress against NAIP benchmarks is possible only if there is an initial statement of planned

TABLE 6.2—BUDGET ALLOCATION BY AGRICULTURAL SUBSECTOR (PERCENT OF TOTAL NAIP BUDGET)

Country, plan duration	Crops	Livestock	Fishery	Forestry
Benin, 2010–15	60.6	0.8	3.2	n.a.
Burkina Faso, 2011–15	37.3	28.0	n.a.	28.0
Cote d'Ivoire, 2010–15	n.a.	n.a.	7.5	11.2
Liberia, 2011–15	20.5	1.3	1.3	4.4
Mali, 2011–15	49.9	23.6	20.6	n.a.
Senegal, 2010–15	69.3	10.9	4.7	n.a.
Togo, 2010–15	65.5	6.8	3.1	n.a.

Source: Authors' calculation based on national agricultural investment plans.
Notes: Percentages may not add up to 100 across the subsectors because the total budget was not allocated as such or could not be distributed.
n.a. = not available. Data were not available or the budget could not be distributed.

TABLE 6.3—BUDGET ALLOCATION BY COMMODITIES AND COMMODITY GROUPS (PERCENT OF TOTAL NAIP BUDGET)

Country, plan duration	Commodities and budget allocation
Benin, 2010–15	Rice=24.9%, Corn=18.7%, Pineapple=4.2%, Vegetables=4.1%
Gambia, 2011–15	Rice=20.1%
Malawi, 2011–14	Maize=37.2%
Mali, 2011–15	Rice=30.1%, Corn=12.7%, Millet/Sorghum=7.2%
Nigeria, 2011–14	Cash crops=13%, Rice=2.8%
Senegal, 2010–15	Groundnut=8.9%, Maize=8.6%, Sorghum=4.5%, Cowpea=3.8%, Rice=1.4%, Onion=0.8%, Banana=0.3%, Potato=0.1%, Mango=0.1%

Source: Authors' calculation based on national agricultural investment plans.

FIGURE 6.1—BUDGET ALLOCATION BY INVESTMENT AND RECURRENT EXPENDITURE (PERCENT OF TOTAL NAIP BUDGET)

Source: Authors' calculation, based on national agricultural investment plans.

distinction made between investments and current expenditure (Figure 6.1). In the others, the assumption is that all expenditures associated with NAIPs are classified as investments—a logical interpretation of the title, national agricultural investment plan. But the review shows that many of the components of the programs proposed are in fact current expenditure items (as discussed below, in relation to disaggregation of PAE by function). This highlights the challenge in making the distinction between investment and current expenditure, as, for example, in classifying current expenditures that are used to maintain the value of capital assets. In general, government expenditures financed by donors have been classified as investments irrespective of what the funds are actually spent on (Arkroyd and Smith 2007), and this approach seems to have dominated in the classification of NAIP budgets, given that nearly all of the NAIPs were developed as proposals for raising funds from donors.

expenditures. In general, obtaining PAE data disaggregated by subsector and key commodities is relatively easy—as compared to disaggregation by objectives, for example. Governments have specialized MDAs for these subsectors and strategic commodities, and audited public expenditure accounts usually have outlays associated with these MDAs that are easy to aggregate. It is more difficult to obtain related expenditures that are undertaken by other, nonspecialized MDAs. Obtaining comprehensive data will require including another code or identifier for specific outlays, aside from the codes that identify the MDAs.

Disaggregation of PAE by current spending and investments

Classification of PAE into current and investment items represents another standard reporting output in many countries, as seen in their audited public expenditure accounts. However, among the 19 country NAIPs reviewed, only in four cases (Ghana, Ethiopia, Liberia, and Senegal) was there a

Disaggregation of PAE by functions

The functional classification of PAE relates to the issue of how governments are planning to achieve the objectives stipulated in the NAIPs. Moreover, the functional classification of PAE relates fundamentally to the provision of specific agricultural public goods and services, a major rationale for public spending in general. In the context of agricultural development, the

rationale for PAE hinges on market failures: imperfect markets, information asymmetries for agricultural technology advancement, and the need for government promotion of the adoption and use of technologies and other productive investments in the sector (Mogues et al. 2012). Expenditures on administration, policy formulation, research, extension, irrigation, farm support, regulation, and the like are some of the common ways to classify PAE by function. (Box 2.1 provides details on different functions.) The NAIPs show how different countries intend to prioritize the provision of different public goods and services, in their planned expenditure on specific functions (Figure 6.2). It is clear that PAE for natural resource management and farm support and subsidies tend to dominate the budgets, followed by irrigation. Research and extension have been found to have the largest and long-lasting impact on agricultural growth and other development outcomes; Mogues et al. (2012) provide a review of the evidence. Nevertheless, research and extension are stated priorities in only a handful of countries, including Benin, Burundi, Cote d'Ivoire, and Uganda. The main challenge for implementing this

classification, and for obtaining PAE data that are disaggregated by these functions, is identifying PAE in MDAs with multisectoral objectives and functions.

Disaggregation of PAE by beneficiary

Agricultural public goods and services derived from PAE are by their nature expected to confer common benefits on everyone involved with the agriculture sector or dependent on the sector for their livelihoods. Nevertheless, there are people or groups of people who may not be in a position to benefit because of limited economic, physical, or social access to the agricultural

FIGURE 6.2—BUDGET ALLOCATION BY SELECTED FUNCTIONS (PERCENT OF TOTAL NAIP BUDGET)

Source: Authors' calculation, based on national agricultural investment plans.
Notes: percentages may not add up to 100 because the total budget was not allocated as such (appendix Table A.6 provides details).

public goods and services. Accordingly, PAE may be designed to target such people or groups of people (for example, aged, female, and youth farmers). Similarly, different groups of people, or different locations, may be targeted in the agricultural transformation with different types of PAE: for example, smallholder vs. large-scale commercial farmers, different agroecological zones, rural vs. urban, high-potential vs. low-potential areas. The different country NAIPs reflect these types of targeting, although only five had targeted budgetary allocations of this kind (Table 6.4).

Because of the decentralization of governments and the devolution of public spending to local governments taking place in many African countries, location-specific PAE data are the easier category to obtain from public accounts. However, disaggregation of PAE data by other beneficiary categories is far more difficult to obtain, for example by age and gender of beneficiaries, especially where the consumption or utilization of particular public services is self-enforcing. In such instances, the best method for estimating PAE for different socioeconomic groups is a public services delivery and utilization survey. In extension services delivery, for example, research shows that gender similarity between the service provider and the recipient

plays a major role in its effectiveness (Lahai, Goldey, and Jones 2000). This suggests that PAE disaggregated by the age and gender of service providers can provide proxies for PAE on corresponding target groups.

Disaggregation of PAE by sources of financing

The demand for inclusive stakeholder participation in setting policy and investment priorities under the CAADP agenda is reflected in the multiple signatories to the CAADP compacts, symbolizing also the different stakeholders' commitments to financing and implementing the NAIPs. A fundamental question is, to what extent have the different partners been able to meet their overall financial commitments? Figure 6.3 shows most countries' heavy dependence on external sources for financing the NAIPs: only in Ethiopia and Kenya is government financing expected to account for more than half of the total budget, at 60 and 65 percent respectively. In many of the countries, the unfunded amount (that is, the funding gap) is quite large—at 50 percent or more for Benin, Gambia, Ghana, Senegal, and Togo.

Obtaining data to assess progress in meeting the commitments is relatively easy for funds that are transferred through the government accounting system or budget support; disaggregation of the data by specific development partners may also be included. There can be controversy over the transfer of donor funding, arising from discrepancies between the amount a government reports to have received from donors and the amount donors report to have provided to the government—a problem that often arises concerning the estimated value of technical assistance. Although the private sector is a signatory to most of the CAADP compacts that have been signed so far, commitments by the private sector were scarcely reflected in the NAIPs. In general, data on private-sector investments in the agriculture sector are difficult to obtain.

TABLE 6.4—BUDGET ALLOCATION BY TARGET POPULATION (PERCENT OF TOTAL NAIP BUDGET)

Country, plan duration	Commodities and budget allocation
Liberia, 2011–15	Women and youth=4.8%
Nigeria, 2011–14	Smallholder farmers=35.5%, Commercial farmers=9.6%
Senegal, 2010–15	Youth=48.8%, Men and women=40.3%, Women=0.6%, Men=0.2%
Tanzania, 2012–16	Mainland=92.6%, Zanzibar=7.4%
Uganda, 2011–15	Northern region=2.4%
Source: Authors' calculation based on national agricultural investment plans.	

Disaggregation of PAE by implementation agencies

Regarding the implementation of the NAIPs, the typical agricultural sector ministries (and their departments and agencies) are expected to take the lead, in collaboration with several other MDAs whose primary functions lie outside the traditional agriculture sector. Other partners and collaborators include a host of organizations from the nonstate sector. What is not clear in the NAIPs is how the expected resources are allocated across all the state and nonstate entities to implement their expected functions, as stated in the NAIP.

The rationale for disaggregation by agency is to show how the different implementers are resourced to carry out their assigned roles; however, none of the NAIPs specified such allocations. Without such budget allocations, it will be difficult to assess the progress of different agencies in implementing the NAIP relative to the resources budgeted and transferred.

Because implementation of CAADP in general is expected to involve collective action, with many different actors involved at different levels, a key issue is how the allocated resources influence the incentives of actors to deliver their expected outputs. The disaggregation of PAE data by different

actors will be useful for addressing this question. This type of assessment is critical for improving the efficiency of PAE in relation to implementation of the NAIP.

PAE data standards and methodologies: The case of Kenya

It is clear that the reports from most of the existing public expenditure accounting systems are inadequate to provide the data required to

FIGURE 6.3—FUNDING SOURCES AND GAPS FOR FINANCING CAADP COUNTRY INVESTMENT PLANS

Source: Authors' calculation, based on national agricultural investment plans.

FIGURE 6.4—CLASSIFICATION CODING SYSTEM FOR GOVERNMENT FINANCE STATISTICS (GFS)

Transactions

1 Revenue
There are different levels or digits of codes for different sources (taxes, grants, etc.). This can be used to disaggregate PAE by sources of financing, to the extent that it is linked with the COFOG part.

2 Expense
There are different levels or digits of codes for different economic classes (salaries, goods and services, consumption of fixed capital, etc.). This can be used to disaggregate PAE by current and capital expenditures, to the extent that it is linked with the COFOG part.

3 Transactions in Nonfinancial Assets

Transactions in Financial Assets and Liabilities classified by instrument

Other Economic Flows

4 Holding gains/losses in Nonfinancial and Financial Assets and Liabilities

5 Other volume changes in Nonfinancial and Financial Assets and Liabilities

Stock of Assets and Liabilities

6 Nonfinancial and Financial Assets and Liabilities

7 COFOG:[1] Expense and Transactions in Nonfinancial Assets

In general, the COFOG is potentially the source for obtaining information to disaggregate PAE by objectives, subsectors, commodities, functions, and beneficiary.

In the IMF's GFS, however, there are only two digits of codes for PAE: in the aggregate (7042 Agriculture, forestry, fishing, and hunting) and for the subsectors (70421 Agriculture or crops and livestock, 70422 Forestry, and 70423 Fishing and hunting). PAE on agricultural R&D can be obtained (70482 R&D Agriculture, forestry, fishing, and hunting).

Therefore, obtaining information to generate the required data will depend on the extent to which other codes (or digits) have been included to capture the desired information. See example with the data on Kenya in Table 6.5.

8 Transactions in Financial Assets and Liabilities classified by sector[2]

Source: Based on IMF (2001).

Notes: The boldfaced numbers from 1 to 8 refer to the beginning number of the code representing the item in the respective box. In the GFS, codes beginning with 1 refer to revenue; codes beginning with 2 refer to expenses; and so forth.

[1] Classification of the functions of government.

[2] By sector of the counterparty to the financial instrument.

comprehensively assess progress in financing and implementing the NAIPs, in terms of the objectives stated or implied in the NAIP documents. Most of what is currently known about PAE is based on high-level aggregations, making it difficult to verify exactly how the data have been aggregated within and across MDAs and other cost centers.

It is difficult to disaggregate most of the available PAE data according to the different classifications. As a result, public expenditure accounting officials are bombarded with various reporting templates, designed by different donors and researchers to meet their own analytical and reporting needs. This could be avoided if countries can instead release their own detailed disaggregated data, with systematic codes and documentation, so that different users can utilize them to meet their own needs. Because PAE is involved in multiple MDAs, public expenditure data are needed for the entire economy and not only the agencies labeled as agricultural in the public accounting system. Several countries already provide such data in different forms, which can

be accessed and downloaded at the websites of the ministry of finance or the accountant general.

In recent years, more and more developing countries have started to adopt a system of national accounts (chart of accounts) that is consistent with international standards as laid out in the IMF's government finance statistics (GFS) manual (IMF 2001). Figure 6.4 shows the overall classification coding system for GFS, with notes on the different parts from which information can be drawn to generate PAE data and to disaggregate them by the categories presented in the preceding section. It is clear that most of the required classes of data can be obtained, depending on the organization of codes and the details or levels of breakdown. As the system currently stands, however, it will be difficult to generate PAE data disaggregated by objectives or by some of the beneficiary indicators, without the introduction of additional codes.

Table 6.5 shows data for one country, Kenya, whose system of national accounts provides publicly available

TABLE 6.5—DESCRIPTION OF KENYA'S OPEN DATA ON PUBLIC EXPENDITURES

Variable Name	Description (remarks)
Year	2002/03–2010/11
Central/Subnational	Three categories or levels: Constituencies Development Fund (CDF), Central, Local Authorities (can be coded)
Vote	Line ministries, legislative bodies, municipalities, councils and constituencies within the central; with unique codes
Sub-Vote	Different department and service units within the central-level Vote; with unique codes
Head	Different agencies and programs with the central-level Vote and Sub-Vote; with unique codes
Sub-Head	Different implementation units and projects within the central-level Vote, Sub-Vote, and Head; with unique codes (but many are missing)
County	Names of counties (can easily be numerically coded)
District	Names of districts; with unique codes (or can easily be recoded)
CDF project	Names of projects within the CDFs (too many to code)
MTEF sector	12 sectors identified in medium-term expenditure framework (General Administration; Agriculture and Rural Development; Environment Water and Irrigation; Governance, Justice, Law and Order; Human Resource Development; National Security; Physical Infrastructure; Public Administration and International Relations; Research, Innovation and Technology; Special Programmes; Trade, Tourism and Industry; and Other (can easily be coded)
Subsector	Total of 34 subsectors by breaking down each sector into 2–4 (all many not be relevant for each year; can easily be coded)
Current or capital	Expenditures classified into four groups: capital, current, interest, other
GFS classification	Expenditures and revenues classified into 17 groups: Allowances, Capital, Financial Assets, Goods and Services, Grants, Grants/Loans, Interest, Loans of domestic, Loans from donors, Net Lending, Receipts, Training, Transfers, Travel, Vehicles Wages, Salaries and Contributions, Other (can easily be coded)
Line item	Details description of expenditures and receipts; with codes for central-level MDAs and CDF spending (full coding will require a lot work)
Estimates	Budget and revenue estimates in KShs
Revised	Revised budget and revenue estimates in KShs
Executed	Actual expenditures and revenues in KShs
Budget Type	Classified into two: development and recurrent
A-in-A	Appropriation in Aid, meaning the line item expenditure is partially or fully supported by the use of internally generated income or receipts
Location_1	Unknown and empty

Source: Authors' description, based on Kenya Open Data (2013).
Note: There are 520,844 records or observations.

information that allows some disaggregation of PAE data (Kenya Open Data on public expenditures).[17]

Kenya's Open Data system also provides an illustration of the chart of accounts for the Kenyan government, which organizes government expenditures according to a numerical coding system. The classification of functions—equivalent to COFOG, shown in Figure 6.4—is as follows. The first two digits of the code represent the highest or first level of government bodies, such as ministries or ministerial level government agencies; these are usually cost centers (called *Vote*) approved by the parliament. The next three digits of the code are used to classify the second level of government entities (called *Sub-Vote*), including departments within a ministry (or a first-level entity). The last three digits represent the programs or units within a department (or a second-level entity, called *Head*). Table 6.6 shows part of the coding structure for the Ministry of Agriculture (code=10), including one of its departments (Facilitation and Supply of Agriculture Extension Service, code=10.103) and several units within that department. The chart of accounts for the Kenyan government also includes economic classifications with numerical codes (equivalent to items 1 and 2, in Figure 6.4). Other variables and codes included in the system allow disaggregation of the data by local government (counties and districts), by (medium-term) expenditure framework sectors and subsectors, and by specific projects (see Table 6.5).

With such a detailed classification coding system, it is possible to identify most of PAE across different MDAs and levels of government, as described in Table 6.7. However, the "Line Item" codes (for description of the expenditures—see Table 6.5) are available only for expenditures by central government bodies and for some of the Constituencies Development Fund accounts, so complete classification of PAE is not yet possible. The public investment team at IFPRI is currently working on this and some similar datasets to develop supplemental

TABLE 6.6—EXAMPLE OF CODES FOR KENYA'S MINISTRY OF AGRICULTURE AND A DEPARTMENT AND PROGRAMS OR UNITS WITHIN IT

Code	Description	Level
10	Ministry of Agriculture	Ministry
10.103	Facilitation and Supply of Agriculture Extension Service	Department
10.103.202	Agricultural Department Headquarters	Agency/Unit/Program/Project
10.103.225	Central Kenya Dry Areas and Smallholder Community	Agency/Unit/Program/Project
10.103.229	Agriculture Technology Development and Testing Station	Agency/Unit/Program/Project
10.103.237	Horticultural Crop Development Services	Agency/Unit/Program/Project
10.103.255	Extension Research Liaison and Technical Building	Agency/Unit/Program/Project
10.103.260	Farmers Training Centers	Agency/Unit/Program/Project
10.103.271	Nation Extension Project	Agency/Unit/Program/Project
10.103.638	Provincial Agricultural Extension Services	Agency/Unit/Program/Project
10.103.759	Kenya Agricultural Research Institute	Agency/Unit/Program/Project
10.103.760	Soil and Water Management Research	Agency/Unit/Program/Project
10.103.764	Range and Arid Land Research	Agency/Unit/Program/Project

Source: Authors' illustration based on Kenya Open Data (2013).

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[17] The data can be downloaded at https://opendata.go.ke/Public-Finance/Public-Expenditure-2002-2010/n28e-myf3.

TABLE 6.7—IDENTIFYING PAE ACROSS MDAS IN KENYA'S OPEN DATA ON PUBLIC EXPENDITURES

A: Traditional central-level ministries and sub-national accounts (Votes) identified as agriculture-related in the system according to the medium-term expenditure framework (MTEF codes)—these account for the bulk of PAE associated with administration, supervision, regulations, research and development, service provision, and statistics (see Box 2.1)

Constituencies Development Fund

Ministry of Agriculture

Ministry of Cooperative Development and Marketing

Ministry of Fisheries Development

Ministry of Forestry and Wildlife

Ministry of Livestock Development

B: Other central-level ministries with PAE (irrigation, forestry, land) identified using the "Sub-Vote", "Head", and "Sub-Head" codes

Ministry of Environment and Mineral Resources

Ministry of Lands and Housing

Ministry of Water and Irrigation

C: Central-level ministries with PAE (mostly purchase of farm inputs) identified using "Line Item" codes

Ministry of Development of Northern Kenya and Other Arid Lands

Ministry of Education

Ministry of Energy

Ministry of Gender, Sports, Culture, Social Services, Children, and Social Development

Ministry of Higher Education, Science, and Technology

Ministry of Industrialization

Ministry of Labor and Human Resource Development

Ministry of Planning and National Development

Ministry of Regional Development

Ministry of Roads, Public Works, and Housing

Ministry of State for Public Service, Directorate of Personnel Management

Ministry of State for Special Programmes

Ministry of Tourism and Wildlife

Ministry of Transport

Ministry of Youth Affairs and Sports

Office of the Deputy Prime Minister and Ministry of Finance

Office of the Deputy Prime Minister and Ministry of Local Government

Office of the President and Ministry of State for Provincial Administration and Internal Security

Office of the Vice President and Ministry of State for National Heritage

Source: Authors' description based on Kenya Open Data (2013) and IMF (2001).

codes, to map individual countries' government finance statistics and thus generate a more disaggregated COFOG (Box 2.1).

From Table 6.7, it is clear that changing the way agriculture is defined in the system can lead to substantially different estimates of PAE. Table 6.8 illustrates the potential discrepancies in estimates of total PAE using different ministries (Vote) and certain Sub-Votes, with PAE (irrigation and land) identified. The aggregate above remains a black box, as users are not clear what is included in Ministry of Agriculture expenditure.

Such high-level aggregation does not allow us to assess the allocation issue within agricultural expenditure, although it is well known that different expenditures have different effects on agricultural performance; for example, expenditures on R&D, extension, and irrigation have different effects than expenditures on input subsidies. The detailed chart of accounts

allows data aggregation for specific purposes, so that data analysis will become much easier and more straightforward. For example, Table 6.9 lists Vote, Sub-Vote, and Heads related to agricultural R&D in Kenya's budget structure. Users can then conveniently customize their expenditure aggregate according to ministry, institute, function, or other attributes like salary and capital investment (defined in line items).

Similarly, the composition of agricultural expenditure can be flexibly presented by sector, function, or beneficiary, or distinguish between capital and recurrent spending. With such a coding system, mapping the relationship between countries' government finance statistic systems and COFOG (or any other aggregation classification) becomes explicit: the aggregated data are no longer a black box, unlikely to be consistent across countries and hence inadequate for purposes of comparison.

TABLE 6.8—PRELIMINARY ESTIMATES OF TOTAL PUBLIC AGRICULTURAL EXPENDITURE IN KENYA ACCORDING TO DIFFERENT DEFINITIONS, 2002–2009 (BILLIONS OF KENYA SHILLINGS)								
Sources of PAE	2002	2003	2004	2005	2006	2007	2008	2009
Agriculture (reported by IMF)	10.67	10.49	12.21	10.85	9.92	14.14	16.79	31.81
Ministry of agriculture	8.16	6.99	6.32	8.48	11.39	14.35	14.31	21.98
Ministry of agriculture + livestock + fishery	8.16	9.82	9.28	11.84	15.95	19.60	20.99	33.39
Ministry of agriculture + livestock + fishery + irrigation	8.16	10.18	9.85	12.72	17.41	21.29	23.20	38.91
Ministry of agriculture + livestock + fishery + irrigation + land	8.32	10.35	9.98	12.80	17.50	21.38	23.29	39.00
Ministry of agriculture + livestock + fishery + irrigation + land + regional	8.40	10.44	10.08	12.86	17.54	21.42	23.36	39.07
Source: Authors' calculations based on Kenya Open Data (2013) and IMF (2013).								

TABLE 6.9—VOTES, SUB-VOTES, AND HEADS RELATED TO AGRICULTURAL R&D IN KENYA

Vote	Vote name	Sub-Vote	Sub-Vote name	Head	Head name
10	Ministry of agriculture	10.101	Policy, legal reviews, and regulation of agricultural inputs and outputs	10.101.238	Horticultural crop development authority (HCDA)
		10.102	Monitoring and management of food security	10.102.238	Headquarter horticultural crop production service
		10.103	Facilitation and supply of agriculture extension service	10.103.180	Small-scale horticulture development project
				10.103.237	Horticultural crop development authority (HCDA)
				10.103.238	Headquarter horticultural crop production service
				10.103.661	District horticultural crop production services
				10.103.759	Kenya agricultural research institute
				10.103.760	Soil and water management research
				10.103.761	National crops and horticultural research project
		10.104	Information management for agriculture sector	10.104.258	Embu agricultural college
				10.104.259	Bukura agricultural college
				10.104.261	Kilifi institute of agriculture
				10.104.759	Grants to international organizations
				10.104.760	Soil and water management research
				10.104.761	National horticultural research project
31	Ministry of education	31.313	Secondary and tertiary education	31.313.840	Jomo Kenyatta university of agriculture and techno
		31.318	University education	31.318.840	Jomo Kenyatta university of agriculture and techno
43	Ministry of higher education, science, and technology	43.435	University education	43.435.840	Jomo Kenyatta university of agriculture and techno

Source: Authors' calculations, based on Kenya Open Data (2013).

7| Conclusions and Implications

In 2003, heads of state of African countries launched the CAADP and committed to invest 10 percent of their total expenditures in the sector—popularly known as the Maputo Declaration. Several efforts have been made to track and evaluate the amounts and quality of public investments in the sector, whose outputs will be important for determining the types and magnitudes of public agricultural investments required for countries to achieve their development objectives. The overall goal of this report is to present patterns and PAE in Africa, as well as to identify the data needs for further PAE analysis as countries gear up for the joint agriculture sector reviews of the NAIPs. This chapter summarizes the main findings, with their implications for identifying the specific types of PAE that would result in the largest productivity benefits for sustainable pro-poor growth.

Trends in PAE

In 2003–2010, the amount of PAE for Africa as a whole increased from an average of about $0.39 billion per country in 2003 to $0.66 billion in 2010. Whereas this growth performance in PAE seems impressive, at 7.4 percent per year on average, it was lower than the growth in total expenditures of 8.5 percent per year on average. This suggests that, for Africa as a whole,

the share of PAE of total government expenditures has declined over this period. Since 2003, when the Maputo declaration was made, 13 countries have surpassed the CAADP 10 percent target in any year: Burundi, Burkina Faso, Republic of Congo, Ethiopia, Ghana, Guinea, Madagascar, Malawi, Mali, Niger, Senegal, Zambia, and Zimbabwe. Only seven, however, have surpassed the target in most years: Burkina Faso, Ethiopia, Guinea, Malawi, Mali, Niger, and Senegal. Furthermore, different clusters of countries show very different trends in the share of PAE (whether increasing, declining, or stagnating) vis-à-vis the 10 percent target, raising important questions relating to the political and economic justification of how countries make their agricultural sector budget allocations and the definition of the optimum level of PAE.

Composition of PAE

The available data on PAE are not adequately disaggregated to be able to determine how PAE is allocated across different functions and economic uses in ways that are reliably comparable across the different countries. For example, the distinction between current spending and investment is not consistent, apparently due to an accounting issue, as many public financial management systems count all expenditures financed by donors

as investments or development spending, irrespective of what the money is actually spent on. What to count as PAE is also controversial, particularly with regard to investments in rural infrastructure, although the African Union has published a technical note on what to count toward achievement of the CAADP 10 percent agriculture expenditure target.

It is clear that since the mid-2000s many countries spent a large share of PAE on subsidies and programs. These programs have characteristics similar to many of the government-run programs that were implemented in the 1960s and 1970s and abandoned during the structural adjustment and market reforms era, due to their high cost and distortionary effects on the domestic economy. This raises an important question: to what extent have these programs, whose cost-effectiveness remains in dispute, been adjusted to take account of those experiences prior to structural adjustment? Although agricultural R&D is acknowledged to be a major factor in agricultural development, most countries spent far less than the targeted 1 percent of agricultural GDP, set by NEPAD. The top performers in 2003–2010 with respect to this indicator are Botswana and Mauritius (4–5 percent), followed by South Africa and Namibia (2–3 percent) and Burundi, Uganda, Kenya, Tunisia, Morocco, Mauritania, and Malawi (slightly above the 1 percent target).

Linkages between PAE and development outcomes

The literature and empirical evidence from specific case studies within and outside of Africa show that different types of PAE affect agricultural growth and other development outcomes differently, with varying time lags. Based on the available data, and using scatterplots and univariate regressions, this analysis finds only weak correlation between agricultural output growth rate and aggregate PAE growth rate. However, there is a strong correlation between agricultural output growth rate and agricultural R&D expenditure growth rate, with larger correlation coefficients and greater statistical significance being observed for longer time frames. These estimated correlations differ for the different subregions in Africa. Together, these results suggest that (1) not all types of PAE are growth-inducing; (2) PAEs that are growth-inducing, such as agricultural R&D spending, take time to manifest; and (3) it will be important to identify, prioritize, and promote different types of PAE in different areas, finding the correct balance between expenditures with immediate but possibly short-lived benefits, and expenditures that take time to manifest but that offer large and long-lasting economic benefits. This balance rests on the trade-offs of political and economic benefits generated by different types of PAE. Hence it is important to find innovative ways to increase the political and economic benefits associated with the agricultural public goods and services that are critical for long-term economic development but are usually underinvested.

Overall policy implications

Given the low overall levels of total national expenditure—less than $300 per capita in many parts of the continent—even the 10 percent target for PAE may be insufficient for making the expensive, but necessary, investments to achieve stated development results. Therefore, African governments need to be more strategic in using existing resources, whether for subsidies or investments—either to make targeted transfers, or to undertake the type of investments that support or stimulate substantial economic growth in the continent. It will also be critical for African governments to leverage investments from the private sector and to explore other funding arrangements, including working closely with their development partners to secure large grants and low-interest loans for major investments.

How should governments allocate PAE optimally? Because resources are limited and because different types of public spending and investments affect development outcomes differently and with varying time lags, it is impossible to answer the question of optimal allocation of PAE in isolation. The answer has to be based on analysis of the efficiency and distributional effects (or equity) of different types of public spending over a meaningful time frame, including both PAE and public nonagriculture expenditures. It is therefore critical to have public expenditure data that are disaggregated by function, as well as across space and over time. Currently, public accounts records are managed and reported in a manner that reflects the organizational structures of government rather than the specific functions performed, the public goods and services provided, or the outcomes achieved. Investing in public accounts systems that capture these types of information, and then making the data publicly available, will enhance the political accountability of governments to their citizens and promote mutual accountability of state and nonstate actors in agricultural development. More broadly, more transparent data will contribute to improved policymaking, dialogue, implementation, and mutual learning processes of the CAADP implementation agenda.

Appendix

TABLE A.1—TOTAL EXPENDITURE (BILLION 2005 PPP$)

Country	2003	2004	2005	2006	2007	2008	2009	2010
Algeria	69.325	70.520	66.016	71.499	85.556	96.161	108.411	110.205
Angola	25.963	13.441	19.883	28.495	30.875	35.095	51.814	57.865
Benin	2.058	2.007	2.232	2.090	2.507	2.520	3.119	2.645
Botswana	8.174	7.850	7.283	6.839	7.792	9.405	11.181	11.418
Burkina Faso	2.466	2.863	3.190	3.762	4.098	3.514	4.208	4.836
Burundi	0.689	0.790	0.895	1.055	1.161	1.142	1.282	1.501
Cameroon	5.720	5.500	5.880	5.864	6.052	5.955	6.416	6.488
Cape Verde	0.413	0.470	0.538	0.516	0.587	0.645	0.744	0.800
Central African Rep.	0.335	0.327	0.547	0.625	0.626	0.448	0.552	0.590
Chad	0.490	0.554	0.614	0.274	0.676	0.647	0.766	0.732
Comoros	..	..	..	..	..	..	..	..
Congo, Dem. Rep.	2.753	3.191	5.477	5.180	5.445	6.166	6.646	6.296
Congo, Rep.	2.732	3.280	2.623	2.581	2.977	2.777	4.080	3.942
Cote d'Ivoire	5.846	5.998	5.885	5.701	6.223	6.566	6.818	7.249
Djibouti	0.529	0.529	0.556	0.577	0.644	0.639	0.683	0.710
Egypt	77.467	79.479	83.203	105.729	102.527	128.785	144.245	136.404
Equatorial Guinea	8.460	6.957	4.682	3.922	3.795	4.376	10.518	12.731
Eritrea	1.722	1.430	1.537	1.090	1.073	1.021	0.771	0.892
Ethiopia	10.384	9.930	11.495	12.142	12.482	12.432	12.346	14.967
Gabon	..	..	..	..	..	..	..	..
Gambia, The	0.208	0.190	0.195	0.204	0.208	0.217	0.219	0.224
Ghana	6.643	8.034	8.251	6.037	7.238	7.884	8.092	9.532
Guinea	..	..	..	..	..	..	..	..
Guinea-Bissau	0.127	0.147	0.207	0.194	0.197	0.199	0.219	0.240
Kenya	8.711	10.289	9.488	11.176	12.308	13.879	14.691	16.248
Lesotho	1.190	1.169	1.246	1.406	1.547	1.735	1.951	2.210
Liberia	0.003	0.003	0.003	0.002	0.004	0.006	0.005	0.006

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.1—TOTAL EXPENDITURE (BILLION 2005 PPP$)—Continued

Country	2003	2004	2005	2006	2007	2008	2009	2010
Libya	..	..	..	..	..	..	..	..
Madagascar	2.292	2.972	2.165	2.978	6.825	8.864	11.563	14.931
Malawi	1.933	1.923	2.424	1.979	2.087	3.223	3.004	3.446
Mali	0.024	0.027	0.029	0.032	0.033	0.028	0.036	0.033
Mauritania	1.963	1.653	1.681	1.762	1.843	2.122	2.466	2.260
Mauritius	2.861	3.005	2.945	3.091	2.916	3.016	3.607	4.064
Morocco	27.317	29.134	35.111	34.270	35.981	40.230	41.160	43.791
Mozambique	2.980	3.033	3.665	3.872	4.543	4.626	5.356	6.340
Namibia	3.084	3.076	3.069	3.169	3.373	3.230	3.374	3.634
Niger	1.317	1.410	1.582	1.656	1.882	2.246	2.384	2.418
Nigeria	29.429	28.359	32.052	25.651	32.767	34.384	38.929	37.885
Rwanda	1.242	1.406	1.653	1.938	2.333	2.627	2.996	3.433
Sao Tome & Principe	0.092	0.082	0.076	0.083	0.105	0.097	0.101	0.106
Senegal	3.502	4.051	4.283	4.975	5.297	5.335	5.520	5.875
Seychelles	0.506	0.642	0.624	0.742	0.746	0.558	0.580	0.663
Sierra Leone	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Somalia	..	..	..	..	..	..	..	..
South Africa	95.221	100.791	107.614	113.993	119.757	131.724	143.768	143.625
South Sudan	..	..	..	..	..	..	..	..
Sudan	..	..	..	..	..	..	..	..
Swaziland	1.441	1.486	2.366	2.730	3.856	4.774	6.761	8.929
Tanzania	6.359	5.903	7.866	11.020	13.369	14.436	17.727	21.615
Togo	0.710	0.743	0.914	1.024	0.946	0.903	1.142	1.177
Tunisia	15.319	16.121	16.670	17.315	18.355	19.978	20.478	20.737
Uganda	5.753	4.780	5.189	5.496	5.810	5.961	5.963	7.466
Zambia	2.672	2.823	3.919	2.676	3.899	3.465	3.487	3.810
Zimbabwe	..	..	..	..	..	..	..	..

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.1—TOTAL EXPENDITURE (BILLION 2005 PPP$)—Continued

Country	2003	2004	2005	2006	2007	2008	2009	2010
Aggregates								
Africa	446.293	446.471	475.751	515.806	561.660	632.378	718.662	743.276
Geographic region								
Central	21.272	20.681	20.793	19.583	20.837	21.609	30.360	32.386
Eastern	38.638	39.457	41.983	49.159	57.433	62.413	70.156	84.097
Northern	191.391	196.908	202.681	230.576	244.262	287.277	316.758	313.397
Southern	142.657	135.592	151.470	165.159	177.728	197.277	230.697	241.276
Western	52.336	53.834	58.824	51.330	61.400	63.803	70.692	72.120
Income classification								
More favorable agriculture and mineral-rich (LI-1)	5.765	6.345	9.946	8.483	9.975	10.085	10.690	10.702
More favorable agriculture and non-mineral rich (LI-2)	43.982	44.780	49.031	55.937	65.380	70.773	79.557	94.134
Less favorable agriculture (LI-3)	5.725	5.841	6.454	6.717	7.929	8.812	9.929	10.377
Middle income (MI)	390.821	389.504	410.320	444.669	478.376	542.707	618.486	628.063
Regional Economic Community								
CEN-SAD	184.560	192.003	206.770	223.140	234.464	270.628	295.831	293.698
COMESA	119.233	123.247	132.400	157.487	163.039	195.532	217.853	222.867
EAC	31.714	33.387	33.896	36.980	39.967	43.588	45.410	49.385
ECCAS	48.477	35.528	42.330	50.016	54.046	59.331	85.170	93.684
ECOWAS	52.336	53.834	58.824	51.330	61.400	63.803	70.692	72.120
IGAD	25.377	25.528	26.728	29.391	31.244	32.911	33.683	39.391
SADC	157.429	151.305	170.548	188.169	207.030	230.317	270.819	288.846
UMA	113.924	117.429	119.478	124.847	141.735	158.491	172.514	176.993

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.2—PUBLIC AGRICULTURE EXPENDITURE (BILLION 2005 PPP$)

Country	2003	2004	2005	2006	2007	2008	2009	2010
Algeria	2.464	2.691	2.792	3.031	1.876	5.003	3.956	4.028
Angola	0.167	0.301	1.286	1.507	1.096	0.797	1.456	2.013
Benin	0.114	0.107	0.143	0.158	0.158	0.184	0.126	0.079
Botswana	0.370	0.288	0.432	0.282	0.272	0.401	0.336	0.325
Burkina Faso	0.807	0.586	0.386	0.766	0.648	0.483	0.367	0.524
Burundi	0.010	0.024	0.031	0.068	0.050	0.066	0.099	0.154
Cameroon	0.205	0.160	0.128	0.139	0.123	0.104	0.096	0.084
Cape Verde	..	..	..	..	..	0.017	0.021	0.027
Central African Rep.	0.014	0.014	0.016	0.016	0.017	0.006	0.012	0.014
Chad	0.028	0.026	0.024	0.021	0.037	0.037	0.045	0.045
Comoros	..	..	..	..	..	..	..	..
Congo, Dem. Rep.	0.051	0.033	0.050	0.062	0.065	0.071	0.068	0.071
Congo, Rep.	0.032	0.035	0.025	0.035	0.162	0.205	0.411	0.541
Cote d'Ivoire	0.211	0.171	0.135	0.144	0.112	0.141	0.210	0.182
Djibouti	0.004	0.011	0.011	0.016	0.010	0.012	0.016	0.020
Egypt	3.945	3.616	3.456	3.161	3.119	2.850	2.628	2.447
Equatorial Guinea	0.113	0.099	0.071	0.064	0.066	0.035	0.084	0.069
Eritrea	..	..	..	..	..	..	..	..
Ethiopia	0.517	0.493	1.831	2.466	2.251	2.352	2.159	3.167
Gabon	..	..	..	..	..	..	..	..
Gambia	0.014	0.013	0.013	0.012	0.015	0.016	0.017	0.017
Ghana	0.379	0.710	0.792	0.622	0.719	0.805	0.730	0.866
Guinea	..	..	..	..	..	..	..	..
Guinea-Bissau	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.002
Kenya	0.371	0.426	0.414	0.502	0.600	0.441	0.574	0.750
Lesotho	0.043	0.059	0.052	0.044	0.051	0.056	0.059	0.063
Liberia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.2—PUBLIC AGRICULTURE EXPENDITURE (BILLION 2005 PPP$)—Continued

Country	2003	2004	2005	2006	2007	2008	2009	2010
Libya	..	..	..	..	..	..	..	..
Madagascar	0.199	0.215	0.303	0.348	0.528	0.703	0.940	1.244
Malawi	0.139	0.131	0.305	0.338	0.299	0.724	0.698	0.994
Mali	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Mauritania	0.103	0.113	0.099	0.103	0.110	0.128	0.152	0.141
Mauritius	0.096	0.119	0.086	0.079	0.092	0.106	0.143	0.153
Morocco	0.864	0.787	0.771	0.759	0.724	0.671	0.648	0.631
Mozambique	0.160	0.197	0.247	0.219	0.235	0.250	0.313	0.351
Namibia	0.127	0.129	0.140	0.114	0.118	0.108	0.107	0.110
Niger	0.148	0.200	0.189	0.207	0.328	0.425	0.332	0.306
Nigeria	1.011	1.608	1.955	1.772	1.712	1.562	2.079	2.176
Rwanda	0.038	0.051	0.071	0.099	0.129	0.148	0.193	0.226
Sao Tome & Principe	0.005	0.003	0.003	0.004	0.006	0.006	0.007	0.007
Senegal	0.328	0.440	0.514	0.533	0.615	0.742	0.767	0.817
Seychelles	0.009	0.008	0.009	0.014	0.018	0.004	0.006	0.009
Sierra Leone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Somalia	..	..	..	..	..	..	..	..
South Africa	1.862	1.949	2.214	2.655	2.873	2.888	2.644	2.609
South Sudan	..	..	..	..	..	..	..	..
Sudan	..	..	..	..	..	..	..	..
Swaziland	0.073	0.080	0.120	0.160	0.318	0.127	0.195	0.473
Tanzania	0.432	0.336	0.371	0.637	0.773	0.989	1.188	1.477
Togo	0.027	0.030	0.039	0.038	0.032	0.086	0.055	0.107
Tunisia	1.359	1.232	1.098	1.139	1.093	1.085	1.171	1.137
Uganda	0.283	0.146	0.245	0.261	0.290	0.188	0.229	0.290
Zambia	0.164	0.173	0.280	0.250	0.514	0.434	0.323	0.388
Zimbabwe	..	..	..	..	..	..	..	..

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.2—PUBLIC AGRICULTURE EXPENDITURE (BILLION 2005 PPP$)—Continued

Country	2003	2004	2005	2006	2007	2008	2009	2010
Aggregates								
Africa	17.295	17.819	21.154	22.851	22.262	25.445	25.646	29.112
Geographic region								
Central	0.459	0.394	0.348	0.409	0.526	0.529	0.822	0.986
Eastern	1.949	1.807	3.341	4.421	4.691	4.944	5.448	7.337
Northern	8.736	8.439	8.216	8.193	6.922	9.737	8.554	8.383
Southern	3.105	3.307	5.075	5.570	5.777	5.785	6.133	7.326
Western	3.045	3.872	4.174	4.258	4.346	4.450	4.688	5.080
Income classification								
More favorable agriculture and mineral rich (LI-1)	0.229	0.220	0.346	0.328	0.596	0.511	0.404	0.473
More favorable agriculture and non-mineral rich (LI-2)	3.066	2.684	4.298	5.748	5.832	6.420	6.668	9.003
Less favorable agriculture (LI-3)	0.331	0.419	0.419	0.503	0.658	0.808	0.823	0.876
Middle income (MI)	13.668	14.496	16.091	16.273	15.176	17.706	17.750	18.759
Regional Economic Community								
CEN-SAD	9.739	10.100	10.066	9.979	10.062	9.686	9.940	10.271
COMESA	5.898	5.528	7.213	7.823	8.285	8.227	8.271	10.387
EAC	2.061	1.880	1.860	2.068	2.162	1.929	2.265	2.557
ECCAS	0.665	0.747	1.705	2.015	1.751	1.475	2.471	3.225
ECOWAS	3.045	3.872	4.174	4.258	4.346	4.450	4.688	5.080
IGAD	1.175	1.077	2.502	3.245	3.152	2.994	2.978	4.228
SADC	3.893	4.018	5.893	6.709	7.253	7.657	8.478	10.281
UMA	4.791	4.823	4.760	5.032	3.802	6.887	5.926	5.936

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.3—AGRICULTURE EXPENDITURE SHARE IN TOTAL EXPENDITURE (%)

Country	2003	2004	2005	2006	2007	2008	2009	2010
Algeria	3.6	3.8	4.2	4.2	2.2	5.2	3.6	3.7
Angola	0.6	2.2	6.5	5.3	3.6	2.3	2.8	3.5
Benin	5.5	5.3	6.4	7.5	6.3	7.3	4.0	3.0
Botswana	4.5	3.7	5.9	4.1	3.5	4.3	3.0	2.8
Burkina Faso	32.7	20.5	12.1	20.4	15.8	13.8	8.7	10.8
Burundi	1.5	3.1	3.5	6.5	4.3	5.8	7.7	10.3
Cameroon	3.6	2.9	2.2	2.4	2.0	1.7	1.5	1.3
Cape Verde	..	..	..	..	..	2.6	2.8	3.3
Central African Rep.	4.3	4.3	2.8	2.6	2.6	1.3	2.2	2.3
Chad	5.7	4.7	3.9	7.8	5.5	5.7	5.9	6.2
Comoros	..	..	1.8	..	..	..	..	..
Congo, Dem. Rep.	1.9	1.0	0.9	1.2	1.2	1.1	1.0	1.1
Congo, Rep.	1.2	1.1	0.9	1.3	5.4	7.4	10.1	13.7
Cote d'Ivoire	3.6	2.9	2.3	2.5	1.8	2.2	3.1	2.5
Djibouti	0.7	2.2	2.0	2.8	1.6	1.9	2.3	2.8
Egypt	5.1	4.5	4.2	3.0	3.0	2.2	1.8	1.8
Equatorial Guinea	1.3	1.4	1.5	1.6	1.7	0.8	0.8	0.5
Eritrea	..	..	..	..	..	..	..	..
Ethiopia	5.0	5.0	15.9	20.3	18.0	18.9	17.5	21.2
Gabon	..	..	..	..	..	..	..	..
Gambia, The	6.9	6.7	6.9	5.7	7.3	7.4	7.6	7.8
Ghana	5.7	8.8	9.6	10.3	9.9	10.2	9.0	9.1
Guinea	..	21.4	10.5	12.7	9.3	14.5	..	..
Guinea-Bissau	1.9	1.8	1.2	1.5	1.2	1.1	1.0	0.9
Kenya	4.3	4.1	4.4	4.5	4.9	3.2	3.9	4.6
Lesotho	3.6	5.1	4.1	3.1	3.3	3.2	3.0	2.9
Liberia	1.7	1.5	1.3	4.0	5.5	8.6	2.3	2.9

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.3—AGRICULTURE EXPENDITURE SHARE IN TOTAL EXPENDITURE (%)—Continued

Country	2003	2004	2005	2006	2007	2008	2009	2010
Libya	..	..	..	..	..	..	..	..
Madagascar	8.7	7.2	14.0	11.7	7.7	7.9	8.1	8.3
Malawi	7.2	6.8	12.6	17.1	14.4	22.4	23.2	28.9
Mali	14.0	15.1	15.5	12.1	13.4	12.7	10.2	11.1
Mauritania	5.3	6.8	5.9	5.8	5.9	6.0	6.1	6.3
Mauritius	3.4	4.0	2.9	2.6	3.2	3.5	4.0	3.8
Morocco	3.2	2.7	2.2	2.2	2.0	1.7	1.6	1.4
Mozambique	5.4	6.5	6.7	5.7	5.2	5.4	5.8	5.5
Namibia	4.1	4.2	4.5	3.6	3.5	3.3	3.2	3.0
Niger	11.2	14.2	11.9	12.5	17.4	18.9	13.9	12.7
Nigeria	3.4	5.7	6.1	6.9	5.2	4.5	5.3	5.7
Rwanda	2.9	3.6	4.5	5.1	5.5	5.6	6.4	6.6
Sao Tome & Principe	5.4	3.1	4.0	4.4	5.9	6.2	6.5	6.9
Senegal	9.4	10.9	12.0	10.7	11.6	13.9	13.9	13.9
Seychelles	1.8	1.2	1.5	1.8	2.5	0.7	1.0	1.4
Sierra Leone	4.1	2.4	2.1	2.1	2.5	2.2	2.0	1.7
Somalia	..	..	..	..	..	..	..	..
South Africa	2.0	1.9	2.1	2.3	2.4	2.2	1.8	1.8
South Sudan	..	..	..	..	..	1.4	1.9	1.4
Sudan	3.1	5.4	5.9	6.5	7.0	..	..	..
Swaziland	5.0	5.4	5.1	5.9	8.2	2.7	2.9	5.3
Tanzania	6.8	5.7	4.7	5.8	5.8	6.9	6.7	6.8
Togo	3.9	4.1	4.2	3.7	3.4	9.6	4.8	9.1
Tunisia	8.9	7.6	6.6	6.6	6.0	5.4	5.7	5.5
Uganda	4.9	3.1	4.7	4.7	5.0	3.2	3.8	3.9
Zambia	6.1	6.1	7.2	9.3	13.2	12.5	9.3	10.2
Zimbabwe	10.4	11.7	4.0	17.3	18.8	22.0	25.8	30.2

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.3—AGRICULTURE EXPENDITURE SHARE IN TOTAL EXPENDITURE (%)—Continued

Country	2003	2004	2005	2006	2007	2008	2009	2010
Aggregates								
Africa	3.9	4.0	4.4	4.4	4.0	4.0	3.6	3.9
Geographic region								
Central	2.2	1.9	1.7	2.1	2.5	2.5	2.7	3.0
Eastern	5.0	4.6	8.0	9.0	8.2	7.9	7.8	8.7
Northern	4.6	4.3	4.1	3.6	2.8	3.4	2.7	2.7
Southern	2.2	2.4	3.4	3.4	3.3	2.9	2.7	3.0
Western	5.8	7.2	7.1	8.3	7.1	7.0	6.6	7.0
Income classification								
More favorable agriculture and mineral rich (LI-1)	4.0	3.5	3.5	3.9	6.0	5.1	3.8	4.4
More favorable agriculture and non-mineral rich (LI-2)	7.0	6.0	8.8	10.3	8.9	9.1	8.4	9.6
Less favorable agriculture (LI-3)	5.8	7.2	6.5	7.5	8.3	9.2	8.3	8.4
Middle income (MI)	3.5	3.7	3.9	3.7	3.2	3.3	2.9	3.0
Regional Economic Community								
CEN-SAD	5.3	5.3	4.9	4.5	4.3	3.6	3.4	3.5
COMESA	4.9	4.5	5.4	5.0	5.1	4.2	3.8	4.7
EAC	6.5	5.6	5.5	5.6	5.4	4.4	5.0	5.2
ECCAS	1.4	2.1	4.0	4.0	3.2	2.5	2.9	3.4
ECOWAS	5.8	7.2	7.1	8.3	7.1	7.0	6.6	7.0
IGAD	4.6	4.2	9.4	11.0	10.1	9.1	8.8	10.7
SADC	2.5	2.7	3.5	3.6	3.5	3.3	3.1	3.6
UMA	4.2	4.1	4.0	4.0	2.7	4.3	3.4	3.4

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.
Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.4—DISAGGREGATED PUBLIC AGRICULTURAL SPENDING

TABLE A.4a—PUBLIC AGRICULTURAL SPENDING (% ON CROPS AND LIVESTOCK, FORESTRY, AND FISHERY, ANNUAL AVERAGE 2003–2007)

Region	Country	Crops and livestock	Forestry	Fishery
Central	Congo, Rep.	56.9	30.7	12.4
	CAR	57.2	42.8	0
	Congo, D. R.	79.6	20.4	0
	S. T. & Principe	81.1	0.0	18.9
	Burundi	87.8	9.9	2.3
	Chad	88.4	11.6	0
Eastern	Djibouti	41.3	52.5	6.2
	Seychelles	50.9	18.8	30.3
	Uganda	62.8	31.3	5.9
	Madagascar	68.4	10.6	21
	Tanzania	75.8	13.4	10.8
Northern	Mauritania	76.2	0.0	23.8
Southern	Namibia	71.9	4.6	23.5
	Malawi	81.7	5.7	12.6
	Zambia	93.3	4.9	1.8
	Lesotho	93.6	6.4	0
	Swaziland	98.2	1.5	0.4
Western	Senegal	71.3	17.0	11.6
	Togo	82.7	10.3	6.9
	Cote d'Ivoire	85.4	13.9	0.6
	Sierra Leone	94.8	2.2	3.0
	Mali	96.2	3.0	0.9

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.4—DISAGGREGATED PUBLIC AGRICULTURAL SPENDING

TABLE A.4b—PUBLIC AGRICULTURAL SPENDING (% ON CAPITAL AND CURRENT, ANNUAL AVERAGE 2003–2007)

Region	Country	Capital	Current
Central	Chad	32.3	67.7
	Congo, Rep.	37.0	63.0
	CAR	54.2	45.8
	Congo, D. R.	61.1	38.9
	Burundi	73.1	26.9
	S. T. & Principe	75.1	24.9
Eastern	Seychelles	5.6	94.4
	Tanzania	34.9	65.1
	Djibouti	37.7	62.3
	Uganda	73.1	26.9
	Madagascar	88.0	12.0
Northern	Mauritania	83.7	16.3
Southern	Namibia	17.0	83.0
	Malawi	25.0	75.0
	Swaziland	34.8	65.2
	Lesotho	36.3	63.7
	Zambia	54.5	45.5
Western	Sierra Leone	11.9	88.1
	Cote d'Ivoire	30.9	69.1
	Togo	71.7	28.3
	Senegal	81.5	18.5
	Mali	87.4	12.6
	Kenya	37.8	62.2
	Ethiopia	56.4	43.6
	Rwanda	72.8	27.2
	Tunisia	77.2	22.8

Sources: Authors' calculation, based on Yu (2012), AUC (2008), and national sources.

Notes: Aggregates are sum of values over countries in group. For countries by geographic region, see Table 2.1; for income classification, see Table 2.2; and for Regional Economic Community, see Table 2.3.

TABLE A.4—DISAGGREGATED PUBLIC AGRICULTURAL SPENDING

TABLE A.4c—PUBLIC AGRICULTURAL SPENDING OF DIFFERENT FUNCTIONS (ANNUAL AVERAGE 2006–2010)

	Burkina Faso	Kenya	Mali	Uganda	Tanzania
Total amount (1,000 LCU)	16.6	28.2	19.8	220.9	209.9
Percent of total amount					
Subsidies	53.5	29.6	36.5	35.4	40.5
Research	10.0	16.9	5.3	15.1	16.3
Extension, training, technical assistance	11.9	28.7	13.7	35.9	30.9
Irrigation	18.2	7.0	10.1	6.4	0.0
Feeder roads and other infrastructure	1.4	3.7	13.5	4.0	0.0
Marketing, storage, and public stockholding	1.9	9.2	14.2	1.9	4.9
Inspection	1.4	3.0	4.1	1.4	0.5
Other	1.8	1.9	2.7	0.0	6.8

Sources: Authors' calculation, based on FAO (2013).

TABLE A.4—DISAGGREGATED PUBLIC AGRICULTURAL SPENDING

TABLE A.4d—PUBLIC AGRICULTURAL R&D SPENDING (MILLION 2005 PPP$)

Region	Country	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Central	Burundi	3.6	4.8	5.2	4.0	3.6	5.6	4.8	5.7	6.5	7.6	9.3	11.0	9.6
	Congo, Rep.	4.7	5.4	5.9	4.4	3.1	3.5	3.7	3.8	3.9	4.2	4.1	4.3	4.6
	Gabon	1.9	1.9	3.5	3.0	2.4	2.2	2.9	1.4	1.6	3.1	2.7	1.9	1.6
Eastern	Eritrea	8.4	11.7	13.5	11.7	8.9	7.2	6.6	6.1	4.7	2.9	3.8	3.5	3.0
	Ethiopia	38.4	36.2	48.4	41.5	49.4	96.2	100.5	90.5	86.4	81.2	81.8	80.7	68.6
	Kenya	166.1	122.8	117.4	140.1	150.7	161.6	131.5	123.8	119.3	134.0	169.0	168.7	171.5
	Madagascar	13.4	28.1	12.7	10.0	8.7	9.5	8.2	10.3	10.9	11.2	11.4	11.4	11.9
	Mauritius	18.3	19.7	21.8	24.2	22.6	27.5	30.9	27.8	29.2	28.1	23.5	22.2	22.1
	Rwanda	14.7	15.0	15.2	15.5	15.7	16.0	16.3	16.5	16.8	17.1	17.4	17.3	18.1
	Sudan	28.8	22.0	29.9	28.0	36.5	26.1	38.5	47.0	51.4	50.7	52.5	53.0	51.5
	Tanzania	22.4	22.9	71.1	29.6	44.0	29.0	39.1	55.0	54.6	29.6	48.2	66.8	77.2
	Uganda	33.2	35.2	30.7	34.6	40.2	40.5	51.8	72.5	72.1	72.2	69.4	78.7	88.0
Northern	Mauritania	7.4	7.2	7.1	7.0	6.8	6.7	14.4	14.2	14.1	9.7	11.5	13.6	6.4
	Morocco	76.5	95.8	86.2	90.2	104.6	108.6	128.3	137.8	148.0	158.9	170.6	183.2	196.8
	Tunisia	45.1	46.7	38.6	43.2	51.4	54.9	58.6	61.6	64.7	68.1	71.5	75.2	79.0
Southern	Botswana	12.4	13.4	15.4	17.4	19.6	21.7	16.7	16.7	19.0	20.2	25.9	24.8	19.0
	Malawi	14.1	14.9	20.2	14.5	13.2	18.5	18.9	19.2	19.6	20.0	20.3	20.7	21.1
	Mozambique	21.0	20.5	20.1	19.6	19.2	18.7	18.3	17.9	17.5	22.2	20.7	17.2	17.7
	Namibia	18.9	19.7	20.5	21.3	22.1	23.0	24.2	24.8	20.9	30.8	21.9	17.4	21.6
	South Africa	318.4	305.7	328.7	293.1	283.2	283.8	292.6	257.6	268.5	303.5	316.4	285.1	272.3
	Zambia	30.3	28.1	16.3	14.2	14.7	10.1	9.8	9.0	8.7	7.4	7.6	9.5	8.1
Western	Benin	11.7	12.2	12.7	13.0	13.4	11.8	13.9	16.3	16.7	17.6	18.8	15.2	21.6
	Burkina Faso	13.1	20.9	23.1	24.9	23.2	15.7	36.3	26.0	26.8	22.0	20.9	18.8	19.4
	Côte d'Ivoire	38.5	37.9	55.4	51.3	55.9	32.4	42.6	42.5	42.8	41.6	43.2	44.8	42.6
	Gambia	2.2	5.8	2.9	2.6	2.6	2.1	1.7	2.0	3.2	3.2	3.5	2.8	2.5
	Ghana	34.3	37.4	42.9	40.8	40.9	39.5	40.5	54.4	55.2	53.5	65.7	75.1	94.6
	Guinea	7.5	9.5	11.2	12.3	10.7	7.0	6.9	5.7	4.0	5.2	4.6	3.9	3.6
	Mali	28.5	26.7	29.9	30.5	33.2	34.8	29.0	22.2	35.7	27.9	25.6	27.1	24.6
	Niger	22.4	17.6	31.1	5.2	4.5	4.9	4.8	5.3	7.0	5.9	5.5	5.8	6.2
	Nigeria	94.5	97.1	155.0	166.2	191.5	293.5	286.5	276.7	297.2	247.5	291.4	313.6	403.9
	Senegal	30.7	30.6	33.7	28.2	25.0	22.6	25.2	28.4	25.2	25.6	19.5	19.1	25.4
	Sierra Leone	2.2	2.3	2.4	2.5	2.7	2.8	4.2	4.7	4.3	4.1	5.6	4.6	5.9
	Togo	8.2	8.0	8.2	5.1	12.5	9.2	9.6	7.4	7.1	9.2	7.9	7.2	8.7

Sources: Authors' calculation, based on IFPRI (2013).

TABLE A.4—DISAGGREGATED PUBLIC AGRICULTURAL SPENDING

TABLE A.4e—PUBLIC AGRICULTURAL R&D SPENDING (% OF AGRICULTURE VALUE ADDED)

Region	Country	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Central	Burundi	0.3	0.5	0.5	0.4	0.5	0.7	0.6	0.7	0.7	1.0	1.3	1.5	1.8
	Congo, Rep.	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.7	0.9
	Gabon	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.4	0.3	0.2	0.2
Eastern	Eritrea	2.0	2.7	2.0	1.8	2.5	1.6	1.6	1.7	1.3	0.5	0.6	0.5	0.5
	Ethiopia	0.2	0.2	0.3	0.3	0.3	0.6	0.7	0.6	0.5	0.4	0.4	0.3	0.3
	Kenya	1.6	1.2	1.1	1.2	1.3	1.4	1.2	1.1	1.1	1.2	1.4	1.4	1.3
	Madagascar	0.5	0.8	0.4	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
	Mauritius	2.3	2.6	2.8	4.6	3.4	3.8	4.9	4.3	4.2	4.2	3.7	3.8	3.9
	Rwanda	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.5
	Sudan	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3
	Tanzania	0.2	0.2	0.6	0.3	0.4	0.2	0.3	0.4	0.3	0.2	0.3	0.4	0.5
	Uganda	0.5	0.6	0.5	0.6	0.8	0.7	1.0	1.3	1.4	1.1	1.0	1.1	1.2
Northern	Mauritania	0.9	0.8	0.8	0.7	0.7	0.7	1.4	1.3	1.3	0.9	1.7	2.1	1.2
	Morocco	0.5	0.8	0.7	0.8	1.0	0.9	1.0	1.0	1.1	1.2	1.3	1.5	1.6
	Tunisia	0.8	0.8	0.7	0.7	0.8	0.9	1.0	1.1	1.1	1.2	1.2	1.3	1.4
Southern	Botswana	2.7	2.9	3.4	4.1	4.5	5.7	4.5	3.5	4.7	5.3	6.4	5.3	4.3
	Malawi	0.6	0.7	0.8	0.5	0.5	0.7	1.0	1.0	1.0	1.1	1.1	1.2	1.2
	Mozambique	1.6	1.4	1.2	1.1	0.9	0.8	0.7	0.6	0.6	0.7	0.5	0.4	0.4
	Namibia	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.6	2.2	2.7	2.0	1.6	2.0
	South Africa	2.7	2.7	3.0	2.8	2.8	2.6	2.2	2.2	2.5	3.1	2.9	2.1	2.0
	Zambia	2.0	1.7	0.9	0.7	0.7	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Western	Benin	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.7
	Burkina Faso	0.4	0.7	0.7	0.8	0.8	0.4	0.9	0.6	0.7	0.5	0.4	0.4	0.4
	Côte d'Ivoire	0.6	0.6	0.8	0.8	0.8	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.5
	Gambia	0.8	1.9	0.9	0.7	0.6	0.4	0.5	0.5	0.7	0.7	0.7	0.6	0.5
	Ghana	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.9
	Guinea	0.7	0.7	0.8	0.8	0.8	0.4	0.4	0.3	0.2	0.3	0.2	0.2	0.2
	Mali	0.9	0.9	0.9	0.9	1.0	1.0	0.9	0.6	1.0	0.7	0.6	0.7	0.6
	Niger	1.0	0.8	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
	Nigeria	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4
	Senegal	1.4	1.4	1.5	1.2	1.0	0.9	1.2	1.1	1.1	1.0	0.8	0.8	0.9
	Sierra Leone	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3
	Togo	0.6	0.5	0.6	0.3	0.9	0.6	0.6	0.4	0.4	0.5	0.4	0.4	0.5

Sources: Authors' calculation, based on IFPRI (2013).

TABLE A.5—DESCRIPTION OF NATIONAL AGRICULTURAL INVESTMENT PLANS REVIEWED

Country: name of plan, duration	Unit	Total budget
Benin: Agricultural Investment Plan, 2010–2015	Billion FCFA	491.25
Burkina Faso: Global Agriculture and Food Security Program, 2011–2015	Billion FCFA	26.78
Burundi: National Agricultural Investment Plan, 2012–2017	Billion FBU	1,452.30
Cote d'Ivoire: National Agriculture Investment Plan, 2010–2015	Billion FCFA	660.18
Ethiopia: Agricultural Sector Policy and Investment Framework, 2010–2020	Billion US$	15.50
Gambia National Agricultural Investment Plan, 2011–2015	Billion US$	296.58
Ghana: Medium-Term Agriculture Sector Investment Plan, 2011–2015	Million GHC	1,532.40
Kenya: Agricultural Development Sector Strategy Medium-Term Investment Plan, 2010–2015	Billion KShs	247.01
Liberia: Agriculture Sector Investment Program, 2011–2015	Million US$	772.30
Malawi: Agriculture Sector-Wide Approach, 2001–2014	Million US$	1,752.00
Mali: National Priority Investment Plan in Agriculture, 2011–2015	Billion FCFA	358.85
Niger: National Agricultural Investment Plan, 2010–2012	Billion FCFA	547.31
Nigeria: National Agriculture Investment Plan, 2011–2014	Billion Naira	235.09
Rwanda: Agriculture Sector Investment Plan, 2009–2012	Million US$	848.12
Senegal: National Agricultural Investment Plan, 2011–2015	Billion Francs	1,346.01
Sierra Leone: Smallholder Commercialization Program Investment Plan, 2010–2014	Million US$	402.60
Tanzania: Agriculture and Food Security Investment Plan, 2011/12–2015/16	Billion TZS	8,752.33
Togo: National Agriculture and Food Security Investment Plan, 2010–2015	Billion FCFA	569.14
Uganda: Agriculture Sector Development Strategy and Investment Plan, 2010/11–2014/15	Billion UGX	2,731.30

Source: Authors' calculation, based on National Agricultural Investment Plans. The plans can be viewed and downloaded at www.resakss.org and http://www.caadp.net/library-country-status-updates.php.

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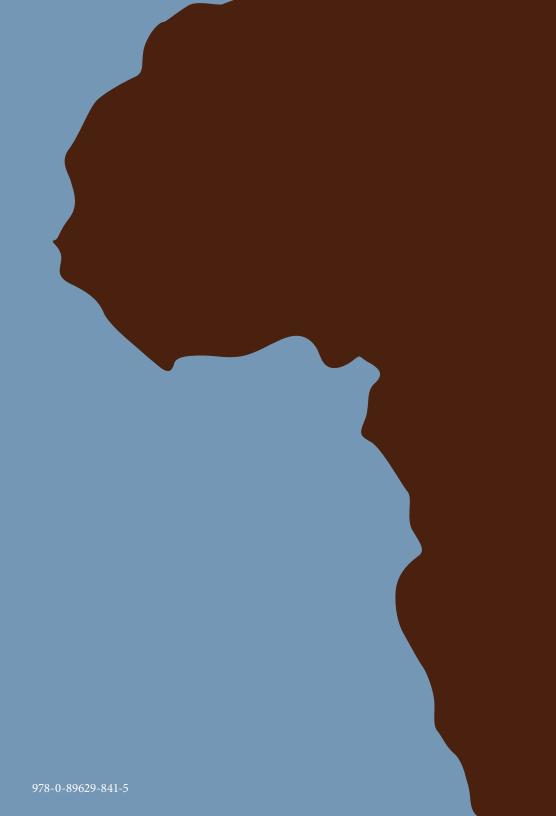
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