International Journal of Economics and Financial Research
ISSN(e): 2411-9407, ISSN(p): 2413-8533
Vol. 4, Issue. 1, pp: 7-12, 2018
URL: http://arpgweb.com/?ic=journal&journal=5&info=aims

Academic Research Publishing Group

Original Research Open Access

Agriculture Public Expenditures and Growth: The Case of Togo

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Abstract

This paper analyzes the trends and evolution of public expenditures in the agriculture sector in Togo, as well as its impact on the growth of agriculture during the period 1985–2015. To this end, we constructed a model capturing both the effect of the volume and the composition of public expenditures in Togolese agriculture. The results highlight the fact that the public investments on agriculture had a positive impact on agriculture growth, whereas public expenditures on fertilizer subsidies had the opposite effect. The study recommends that to revitalize the agriculture sector, the public expenditures should be directed at improving the provision of public investments and services rather than at subsidizing private inputs.

Keywords: Agriculture public expenditures; Subsidies; Publics goods; Growth.

1. Introduction

The provision of public goods and the correction of the impact of market failure are classical justifications for government intervention in the economy. In reality governments: (1) often intervene in markets that are not at all affected by failure or imperfections, and (2) tend to provide large subsidies to private goods to the detriment of the supply of public goods. Misguided public policies that interfere with efficient markets have been a central concern to economists for a long time (Lopez and Galinato, 2007).

In the case of Togo, during the years 2000-2016, national expenditures on agriculture increased from 0, 4% to 9%, an average of 6,3 percent a year in real terms. This was the result of large budget increases and a big expenditures boost across all sectors, with greater amounts for agriculture. Between 2002 and 2011, the real budget of the Agricultural Ministry excluding rural roads has been multiplied by 3.5 in current terms, increasing from CFAF 7 billion to CFAF 25 billion. Rural roads expenditures have increased five-fold, rising from 1 billion 500 to 7 billion 300. In constant terms, they have been multiplied by 3 and 4 respectively. The agricultural expenditures have, in fact, increased faster than the overall budget of the country (MAEP, 2012). This sharp increase in the size of the budget is clearly indicative of the government's desire to significantly increase support for the agricultural sector.

An analysis of the composition of the public expenditures reveals a significant part of input subsidies with a predominant part of fertilizer subsidies. Between 2002 and 2011, the bill of these subsidies has been multiplied by 10, increasing from 0.3 to 3 billion (MAEP, 2012). It is estimated that over the period 2005-2010, the sales prices of fertilizers to farmers had corresponded to an average subsidy of about 35 to 40% of the real cost of import and distribution except in 2009 when it reached 50% due to the sharp increase in fertilizer prices on the international markets.

The exponential increase of the share of subsidies in the budget is due to the fact that since 2007, apart from fertilizer sales price subsidies, a significant proportion of these subsidies are represented by the direct transfer to small producers in the form of grants of inputs (fertilizer, seeds, pesticides and agricultural equipment) in the different regions of the country. These distributions find their justification in the redistribution in favor of small producers stuck in the poverty trap. Although these transfers are necessary to strengthen the purchasing power of poor farmers, they are unlikely to lead to an improvement of agricultural productivity.

Some studies have shown that the impact on agricultural growth of an untargeted input subsidy is much lower than an investment at the same level in providing public goods such as rural access infrastructure, education, research and development etc. (Ariga and Jayne, 2009). A targeted grant may find redistributive justifications for the most vulnerable of the population, but its success may be limited in very heterogeneous agricultural population context where the target group is engaged in a strategy close to survival: the risk is often high that these subsidized inputs may be resold and thus captured by non-target population, or even by producers in neighboring countries. Another reason is that the target group may not have no means (technical skills, manpower, etc.) to transform subsidized inputs into additional production. In these cases the impact of the subsidy in terms of additional production and improvement of the living conditions of the target population would be limited.

This study attempts to assess the impact of the level and composition of public expenditures on agricultural growth. We attempt to answer the following research questions: In order to stimulate agricultural growth, should the Togolese government continue to increase the current level of agricultural public expenditures or, on the contrary, reduce it? What arbitrage should the government operate between subsidies and agricultural expenditures on public goods? In other words, should the government reduce input subsidies in favor of public goods to better impact growth?

This study therefore questions the efficiency of the allocation of public expenditures and in particular the effectiveness of the arbitrage between subsidies and agricultural public investments.

The remainder of the article is organized as follows. Section 2 presents the literature review on the government intervention in agriculture and the effect of subsidies versus public goods on agricultural growth. Section 3 describes the model used to assess the impact of the two components of agricultural expenditures on agricultural growth and the data sources. Section 4 presents and analyzes the results and section 5 concludes and gives some implications of public policy.

2. Literature Review

The purposes of the public sector in agricultural development are to set an enabling environment where private sector activities can flourish; to correct instances under which the market fails to allocate resources efficiently; and to minimize the price distortions faced by both farmers and consumers, while promoting inclusive growth. In practice, those tasks translate into interventions along several dimensions: providing for public goods that are not efficiently and sufficiently produced by the market, such as building rural roads, providing extension services and agriculture marketing, and funding more agriculture research and development; addressing information asymmetries and eliminating information gaps, regulating against monopolistic behavior that reduces social welfare (OMC, 2006).

According to the theory of public economics, only the public sector can supply public goods efficiently (and at adequate amounts) because the market will always under-provide those goods. When supplied in a cost-effective way, public goods will generate higher returns than will investments in private inputs because they will create positive externalities for the economy as a whole. Because governments have the capacity to collect individual contributions to provide public goods, they can also capture economies of scale, access funding, and manage risk better than farmers can manage it. As a result, they are better suited to supply public goods (Armas *et al.*, 2010).

However, the impact on productivity from subsidizing private inputs is unclear. Research shows that the record of governments subsidizing private inputs in the agriculture sector is mitigated, although many governments spend a considerable share of their budgets on such subsidies. The productivity impact of subsidizing private inputs at the expense of the provision of public goods is often negative. Subsidizing private inputs may represent only a transfer of resources with no impact on the consumption of that input and, even if the subsidy increases its use, its impact on productivity is uncertain (Lopez and Galinato, 2007).

According to the latter, government subsidies to private goods cause three forms of crowding-out:

(i) Subsidies crowd out the supply of public goods through the government budget, human, and institutional constraints. The budget crowding-out is obvious: government subsidies compete with the provision of public goods, for both financial and non-financial resources. The empirical evidence overwhelmingly suggests that governments forego investments in public goods which have extremely high rates of return with likely negative effects on per capita income (Alston *et al.*, 2000; Fan *et al.*, 2000; Psacharopoulos, 1994; World Bank, 2000). (ii) Subsidies may directly crowd out private investments. Consider what is often regarded as a "desirable" subsidy: the government offers to pay a portion of the cost for a particular investment. The subsidy is rationed as the funds are normally less than the demand. Consider an investor who is able to extract a profitable return out of an investment (even in the absence of the subsidy) and who potentially may qualify for the subsidy but does not obtain the subsidy. The producer may go ahead with the investment (without getting the subsidy) anyway, since it is a profitable one. Alternatively, she/he may opt to postpone the investment and try again the following year in the hope of getting the subsidy. If the expected value of the subsidy is sufficiently large to compensate the foregone profits of 1 year, the producer may decide to delay the investment. Thus, investments that are privately (and socially) profitable may be postponed as a consequence of the existence of the subsidy. The subsidy increases consumption rather than investment by producers who are able to obtain the subsidy but who would have invested anyway. It also reallocates investment from producers who could have potentially obtained high rates of return to producers who obtain a low social return but invest only because they are able to access the subsidy. The net effect on total investment is ambiguous, but the efficiency impact is negative as a consequence of the latter effect. Empirical studies using detailed firm-level data have shown that subsidies and corporate tax

Concessions targeted to specific firms are at best ineffective in promoting investment and technological adoption and, in some instances, counterproductive (Bregman *et al.*, 1999; Estache and Gaspar, 1995; Harris, 1991; Lee, 1996).

(iii) Subsidies may indirectly crowd out private investment in the intermediate or long run. The low stock of public goods caused by continuous under-investment in public goods causes

low productivity of private investments over the long run. This, in turn, is translated into slower investment and slower productivity growth over the long run (World Bank, 2000).

Armas *et al.* (2010), in this context, assessed the impact of the volume and composition of expenditures on the growth of the agricultural sector in Indonesia. They find that between 1980 and 2009, the ratio expenditure/GDP went from 11 to 35 indicating a depreciation of the efficiency of the use of agricultural expenditures. Analysis of the composition of the expenditures showed that in 2009, the Indonesian government allocated 56% of the expenditures to the subsidy, the proportion of fertilizers representing half of the subsidies. The econometric impact assessment reveals that spending on public goods had a positive effect on agricultural growth while subsidies had a significant negative effect.

Allcott *et al.* (2006), through a similar study of 20 Latin American countries, have shown that public expenditures on rural areas have a positive effect on agricultural growth. The study also revealed that the volume and composition of public spending has a significant impact on agricultural growth. In fact, for a fixed volume of public

agricultural expenditures, the study showed that a broad allocation of these expenditures to the subsidy of agricultural inputs at the expense of public goods had a negative effect on growth.

Lopez and Galinato (2007) found similar results in Latin America and concluded that the effect of government agricultural expenditures on agricultural growth depends essentially on the composition of expenditures. They estimated that a reallocation of 10% of the agri-input subsidy to the financing of public goods increases per capita income by 5%.

In a similar work, Santos and Ortega (Lopez and Galinato, 2007), show how the share of the budget allocated to the subsidy of agricultural inputs has a significant negative effect on the efficiency of public expenditures.

Chand and Kumar (2004) have shown that in India the tendency has been in favor of subsidies over public goods. Government expenditures on agriculture remained at 11 percent of agricultural GDP, while fertilizer subsidies grew faster than the spending on public goods. In addition, subsidy returns have deteriorated, suggesting substantial potential for substantial efficiency gains through the reallocation of public expenditures in Indian agriculture.

Govereh *et al.* (2006) showed that in Zambia, for only 5% of the budget allocated to agriculture,37% of expenditures were spent on fertilizer subsidies in 2005. Only 3% of the budget went to rural infrastructures and 11% for research and extension. A survey of farm households revealed that those who benefited from the fertilizer subsidy and those who did not receive it had similar average incomes. In addition, the beneficiaries were government officials and parliamentarians or wealthy peasants who were close to the paved roads and regional capitals, while the subsidy program was supposed to target the poorest peasants.

These observations have led several researchers to say that subsidies, if they provide some advantages, lead in all cases to inefficient and inequitable management. They result in a wasteful use of resources at the expense of poor farmers who experience a shortfall in growth and income. Thus, the expected redistributive effect of these subsidies is often mitigated. Reallocating these subsidies to public goods would contribute more effectively to growth.

3. Methodology

In this methodology, we describe the model then we present the source and the nature of data.

3.1. The Model

Following Lopez and Galinato (2007), we start the formulation of the model by specifying a production function:

$$Q = F(L, Z, C, K, X, A) \quad (1)$$

Where Q is agriculture output, L is labor used in the sector, Z is land, C is the climate, K is a vector of other primary factors of production owned by farmers, X is a vector of purchased inputs, and A is a productivity index. We assume that F(·) is concave and linearly homogenous in K, L, Z, and X. Agriculture value added or GDP is defined as the returns to primary factors, K, Z, and L. Our contribution is the inclusion of the variable C, the climate in the model. Thus,

$$G(p, v, Z, C, K, L, A) \equiv max\ (p.F(Z, C, K, L, X, A) - vX) \quad (2)$$

Where G(·) is agriculture GDP, p is output price, and v is a vector of input prices. The function G(·) is a dual revenue or value added function and must, therefore, be increasing and concave in L, Z and K. As a consequence of the constant returns to scale assumption, G(·) must also be homogenous of degree one in K, Z, and L. We can, thus, express per capita agriculture GDP as follows:

$$g\ (p, v, z, k, C, A) = DLn\ ((G\ (p, v, Z, L, K, C, A)\ )/L) \quad (3)$$

Per capita GDP growth is a function of output and input prices, the per capita level of the assets owned and the productivity factor, A. It is increasing in p, z, k, and A, and decreasing in v. We postulate that output and input prices are determined by world prices, trade and domestic government policies, and the performance of the non-agriculture economy, which may also play a role in affecting prices of non-traded commodities. That is,

$$p = \emptyset(p^*, H, Y) \quad \textbf{and} \quad v = \varphi(v^*, H, Y) \quad (4)$$

Where p^* and v^* indicate world output and input prices, respectively, H stands for a vector of government policies, and Y reflects conditions in sectors other than agriculture that could affect prices relevant to agriculture. The variables p□, H, and Y are all subject to change over time as world market conditions, domestic policies, and non-agricultural growth conditions vary. The variable A is also endogenous and affected by variables exogenous to the farmer, including domestic market prices and government policies,

$$A = A\ (H, p, v) \quad (5)$$

The level of A is postulated to be affected primarily by government policies, particularly public expenditures in public goods such as R&D, extension, and education. It can also be affected by other market conditions that affect the profitability of adopting new technologies, represented by p and v. Similarly, the conditions of the non-agriculture economy play a role on agriculture through the market effects associated with demand conditions for the commodities and inputs relevant to agriculture. Combining Eqs. (4) and (5) we obtain a reduced-form function for A,

$$A = \Phi\ (p^*, v^*, H, Y) \quad (6)$$

Government policies (H) can be broken down into its subcomponents: trade policies (T), per capita total government expenditures in the sector (E), and the share of government subsidies in the total expenditures in the sector (S).We note that S includes both the direct non-social transfers as well as subsidies that take place via markets that demand government outlays such as credit subsidies, deficiency payments, and stabilization payments. Thus, we can write

$$A = \theta\ (p^*, v^*, T, E, S, Y) \quad (7)$$

We expect that A is non-decreasing in p□, E and Y and decreasing in v□. Following the discussion in the previous section, the effect of S on A is hypothesized to be non-positive. The variable T is defined as an index of trade openness. We expect that due to the fact that the country has used trade protection to discriminate against (favor) agriculture, the effect of T on A is non-negative (non-positive). Substituting Eqs. (4) (5) and (7) in Eq. (3), we now have a reduced form specification for the per capita agricultural GDP function,

$$g = G(p^*, v^*, T, E, S, Y, z, k, C) \quad (8)$$

By totally differentiating (8), it becomes:

$$g = \beta_0 + \beta_1 g(-1) + \beta_2 LnE + \beta_3 LnT + \beta_4 LnS + \beta_5 LnK + \beta_6 LnZ + \beta_7 LnY + \beta_8 Lnp^* + \beta_9 C + \varepsilon \quad (9)$$

Where:

g the growth rate of agricultural GDP per capita ;
g(-1) the variable g lagged for one period;
E (+) stands for per capita total government expenditures in the sector;
T (+) stands for trade policies captured by Index of openness;
S (-) stands for the share of government subsidies in the total expenditures in the sector;
k (+) stands for the per capita level of the assets;
z (+) stands for the agricultural land area per capita;
Y (+) stands for non agricultural GDP per capita ;
p* (+) stands for the real price index of agricultural product;
C (+) is a binary variable taking the value 1 if the annual rainfall is between 500 and 2000 mm and 0 otherwise.
Note: In parenthesis are the expected signs of the coefficients of the variables.

3.2. The Data

The data used are time-series covering the period from 1985 to 2015. They are drawn from several sources. The data of expenditures and subsidies are extracted from the reports of Agriculture Public Expenditures Review. We also used data from FAO database and agricultural national accounts.

4. Results and Discussion

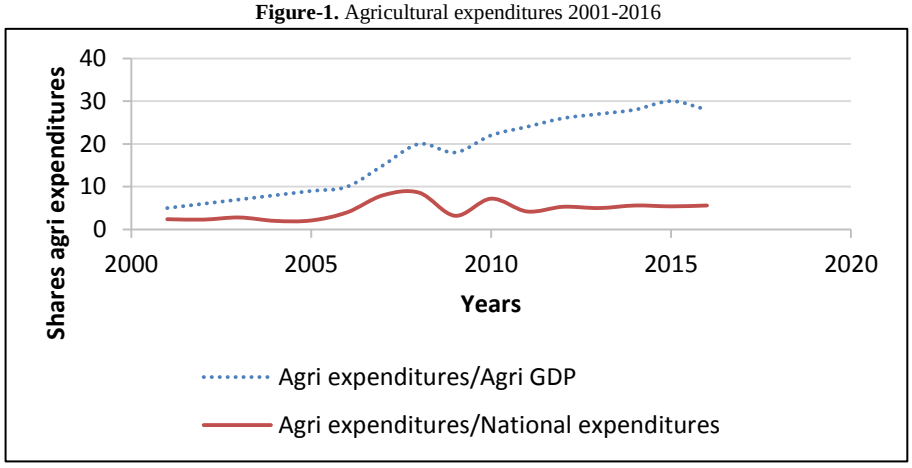
In this section, we describe the trend and the evolution of public expenditures then we present the results of econometric estimation of the impact of subsidies versus public goods on agricultural growth.

4.1. Trend of Agriculture Public Expenditures

The objective of the analysis is to know whether the volume and composition of public expenditures have an impact on growth in the Togolese agriculture sector. We first analyze recent trends for public agriculture expenditures in relation to growth, followed by a time-series quantitative assessment of the impact of public expenditures on per capita growth in Togolese agriculture sector during the period 2000-2016. Public expenditures on agriculture recently have increased in real terms and without a corresponding increase in agricultural production. During the years 2000–2016, national expenditures on agriculture increased from 0, 4% to 9%, an average of 6,3 percent a year in real terms. This was the result of large budget increases and a big expenditures boost across all sectors, with even greater amounts for agriculture. As figure 1 illustrates, the agriculture share of the budget raised from 2,3 percent in 2001 to 8,6 percent by 2008 because of increased expenditures on agriculture subsidies. This increase did not result in a corresponding rise in agricultural production, which increased an average of 3 percent between 2001 and 2008. Low agriculture growth combined with a constant share of labor force participation in the sector has led to stagnant per-worker value added. Recent public expenditures trends in agriculture show that resources are being directed toward supporting private goods at the expense of providing public goods. In 2008, the government of Togo directed 50 percent of agriculture resources toward subsidizing fertilizer subsidies. The budget of the Ministry of Agriculture has increased significantly since 2001, but at a slower pace than agriculture subsidies. A more detailed analysis of the Ministry of Agriculture budget (conducted for the Agriculture Public Expenditure Review) suggests that 35-40 percent of the ministry's budget is allocated to subsidizing private inputs in the form of grants to farmers and farmers' groups (MAEP, 2012). Although these expenditures may be useful in providing income support to poorer farmers, it is unlikely to lead to significant increases in agricultural productivity.

By the early 1990s, the country had achieved high yields across several commodities, including cereals, tubers and cash crops. Unfortunately, in the 1990s the upward trend in productivity flattened. Exacerbated by declining levels of private and public investment, agricultural productivity growth remains sluggish. Expenditures as a share of GDP in agriculture was in average 12 percent between 1980 and 1990, compared with 28 percent today. We argue that because most of the increased expenditures in agriculture is directed at private goods, it has not translated into a proportional increase in growth.

Figure-1. Agricultural expenditures 2001-2016



4.2. Results of the Empirical Analysis

In order to know whether the volume and composition of expenditures have an impact on growth in the agriculture sector, we look at the relationship between agriculture public expenditures and the growth rate of agriculture GDP per capita, using time-series data. The model specified by equation (9) is estimated by the ordinary least squares (OLS). The overall results of the empirical analysis show that expenditures on agriculture has a statistically significant positive effect on the agriculture GDP per capita growth rate after controlling for the effects of non-agriculture GDP per capita growth and for private inputs (arable land and labor). In fact, an increase of 10% of the public expenditures in agriculture leads to an increase of agricultural output growth for 4,3%.

We then split public expenditures on agriculture into expenditures for public investments (research, extension, and infrastructures) and fertilizer subsidies. The results show that expenditures on public investment is a positive driver of the growth rate of agriculture GDP per capita, whereas expenditures on fertilizer subsidies appears to have a significant negative effect. In fact, an increase of 10% in public investment involves an increase of the agricultural growth for 4% whereas the same increase in expenditures on fertilizer subsidies decrease the growth almost in the same proportion. Given the opportunity cost of further financing subsidies at the expense of other agriculture expenditures directly contributing to growth, the government should consider reallocating expenditures from fertilizer subsidies to public investment (such as agriculture extension services, research and development) that could lead to faster sector growth.

Table-1. Estimation results of the impact of the agriculture public expenditures on growth

Variables	Volume effect	Composition effect
Log of total per capita public expenditures in agricultural sector	0,430** (0,036)	-
Share of fertilizers subsidies in agricultural expenditures	-	-0,371*** (0,009)
Share of public investment in agricultural sector	-	0,387** (0,012)
Lag of per capita agricultural GDP	-0,015** (0,018)	-0,017** (0,016)
Log of per capita of non-agricultural GDP	0,230 (0,341)	0,220 (0,132)
Index of openness	0, 223** (0,011)	0, 113** (0,013)
Log of agricultural land area per capita	0,014*** (0,005)	0,019*** (0,007)
Log of price crop index	0,102 (0,262)	0,206 (0,342)
Log of agricultural Labor force	0,054*** (0,007)	0,041*** (0,008)
Climate	0,032 (0,10)	0,122 (0,19)
Constant	-3,087 (0,52)	-2,673 (0,38)
Number of observations	30	30
F(.)	6,25	5,72
DW	2,07	2,37
Adjusted R-squared	0,53	0,59

Source: Author calculation with data from different sources. The model (8) is estimated using OLS. The dependent variable is the per capita agricultural GDP growth. In parenthesis are p-values. *p < 0.1; **p< 0.05; ***p < 0.01.

5. Conclusion and Implications for Public Policy

Over the last decade, public expenditures in agriculture sector grew sharply. This paper analyzes the trends and evolution of public expenditures in the agriculture sector in Togo, as well as its impact on the growth of agriculture during the period 1985–2015. The results highlight the fact that the public expenditures on agriculture had a positive impact on agriculture growth, whereas public expenditures on fertilizer subsidies had the opposite effect. To revitalize the agriculture sector, the public expenditures should be directed at improving the provision of public services rather than at subsidizing private inputs.

It will be important to allocate resources based on the strategy that maximizes expenditures effectiveness, brings higher returns, and leads to growth for the agriculture sector, while it pays attention to farmers' welfare and people's access to affordable food. The government may consider these interventions: firstly reallocate public expenditures from subsidizing private inputs (fertilizer, seeds, and grants to farmers and farmers' groups) to providing agriculture investments and services. Secondly, put in place a comprehensive monitoring and evaluation system that enables the government to assess the effect of its grants programs. Such a system would be instrumental in improving program design, maximizing effectiveness in agricultural productivity, and alleviating poverty in rural areas.

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