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Agriculture Public Spending and Growth: The Example of Indonesia

Enrique Blanco Armas, Camilo Gomez Osorio, and Blanca Moreno-Dodson

This note¹ analyzes the trends and evolution of public spending in the agriculture sector in Indonesia, as well as its impact on the growth of agriculture during the period 1976–2006. Public spending on agriculture and irrigation had a positive impact on agriculture growth during that period, whereas public spending on fertilizer subsidies had the opposite effect. As Indonesia continues its efforts to revitalize the agriculture sector, public spending should be directed at improving the provision of public services rather than at subsidizing private inputs.

Supplying Public Goods Versus Subsidizing Private Inputs

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.

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, mixed, at best—although many governments spend a considerable share of their budgets on such subsidies. The productivity impact of subsidizing private inputs *at the ex-*

pense 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.

The Importance of Public Spending for Agriculture Growth

The purposes of the public sector in agricultural development—primarily a private sector activity—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:

- *correcting for externalities*, which requires making people pay (or be paid) for the cost and benefits of their actions—such as by discouraging the overuse of fertil-

izer that leads to pollution, or by rewarding with a patent advances in research and development;

- *providing for public goods that are not efficiently and sufficiently produced by the market*—such as by building rural roads and irrigation systems, providing extension services and agriculture marketing, and funding more agriculture research and development;
- *addressing information asymmetries and eliminating information gaps* so that farmers and consumers can make informed decisions on what to produce, with what level of inputs, and at what price—for example, by certifying product input and output quality standards and ensuring plant and animal health; and
- *regulating against monopolistic behavior* that reduces social welfare—for example, by having lower outputs sold at higher prices.

There is renewed interest in improving our understanding of the impact of public spending on agricultural growth.² All these studies emphasize the concept of *opportunity costs of subsidies*. Although increased use of a particular input may have a positive effect on production (such as the effect of fertilizer on rice production), the impact of subsidizing such inputs is often negative because it is done at the expense of providing public goods (such as funding for research on newer varieties or improvements to the irrigation network) that have a larger positive impact on production.

In Indonesia, Fuglie (2004) identifies the drivers of growth in agriculture between the 1960s and 2000. He argues that although agricultural productivity in the 1970s and 1980s was increasing, this trend has been flat since the early 1990s, with most growth in agriculture being explained by increases in production inputs (labor and land). Fuglie also argues that the reason for the productivity stagnation from the 1990s onward is the low levels of both private and public investments—in particular, public investments in research and development, rural infrastructure, and irrigation (which are necessary complements to private investments in the sector).

Trends of Agriculture Public Spending in Indonesia

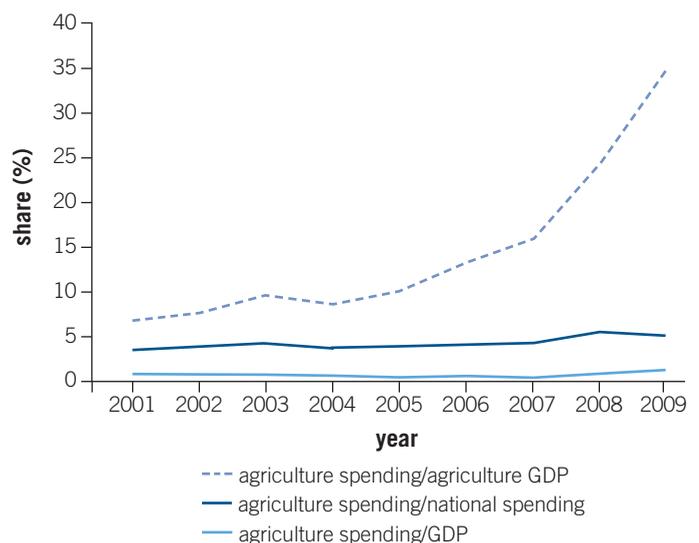
The question that motivated the analysis was whether the volume and composition of public spending are having an impact on growth in the agriculture sector. We first analyze recent trends for public agriculture spending in relation to growth, followed by a time-series quantitative assessment of the impact of public spending on per capita growth in Indonesia's agriculture sector during the period 1976–2006.

Public spending on agriculture recently has increased in real terms and without a corresponding increase in agricultural production. During the years 2001–09, national spending on agriculture³ increased from Rp 11.0 trillion to Rp

61.5 trillion, an average of 12 percent a year in real terms. This was the result of large budget increases and a big spending boost from decentralization across all sectors, with even greater amounts for agriculture. As figure 1 illustrates, the agriculture share of the budget doubled from 3 percent in 2001 to 6 percent by 2008; by that year, it reached 1 percent of GDP because of increased spending 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 2009. Low agriculture growth combined with a constant share of labor force participation in the sector has led to stagnant per-worker value added.

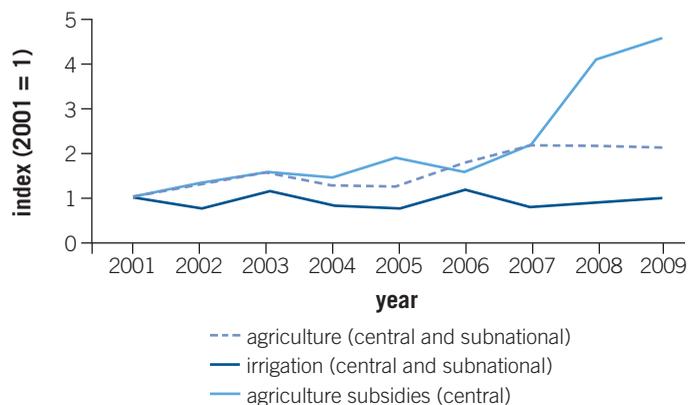
Recent public spending trends in agriculture show that resources are being directed toward supporting private goods at the expense of providing public goods. In 2009, the government of Indonesia directed 56 percent of agriculture resources (Rp 34.4 trillion) toward subsidizing private goods: fertilizer subsidies accounted for almost half (Rp 18.5 trillion), and the remainder was allocated to seeds, RASKIN,⁴ and agriculture credit. As figure 2 shows, by the end of 2009 the allocation for agriculture subsidies was four times its 2001 level, although resources for irrigation have been flat since 2001. 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 more than 40 percent of the ministry's budget is allocated to subsidizing private inputs in the form of grants to farmers and farmers' groups. Although this spending may be useful in providing income support to poorer farmers, it is unlikely to lead to significant increases in agricultural productivity.

Figure 1. Agriculture spending, 2001–09



Source: World Bank staff calculations.

Figure 2. Index of agriculture spending, 2001–09



Source: World Bank staff calculations.

Government investment in public goods was largely behind Indonesia's success in increasing agricultural productivity through the 1970s to the early 1990s. During the years of the Green Revolution, Indonesia invested heavily in its irrigation network, research and development, extension services, and rural infrastructure; and it subsidized private agriculture inputs (fertilizer, seeds, and credit). By the early 1990s, the country had achieved high yields across several commodities, including rice, cereals, and potatoes (World Bank 1994). Unfortunately, in the 1990s the upward trend in productivity flattened. Exacerbated by declining levels of private and public investment, agricultural productivity growth remains sluggish today.

Spending as a share of GDP in agriculture averaged 10 percent and 8 percent in the 1970s and 1980s, respectively, compared with 35 percent today. As discussed earlier, we argue that because most of the increased spending in agriculture is directed at private goods, it has not translated into a proportional increase in growth.

Results of the Empirical Analysis

In trying to learn whether the volume and composition of spending have an impact on growth in the agriculture sector, we look at the relationship between agriculture public spending and the growth rate of agriculture GDP per capita, using time-series data with both ordinary least squares and general method of moments econometric techniques. The model chosen for this analysis introduces specific characteristics and innovations to fit the Indonesian context as well as the broader analysis objectives of the Public Expenditure Review.⁵

The overall results of the empirical analysis show that spending on agriculture has a statistically significant positive effect on the agriculture GDP per capita growth rate, after controlling for the effects of nonagriculture GDP per capita

growth and for private inputs (arable land and labor). We then split public spending on agriculture into spending for public goods (development spending for agriculture and irrigation) and fertilizer subsidies. The results show that spending on public goods is a positive driver of the growth rate of agriculture GDP per capita, whereas spending on fertilizer subsidies appears to have a significant negative effect. The positive effect of public spending on agriculture is associated only with the agriculture and irrigation development component. Given the opportunity cost of further financing subsidies at the expense of other agriculture spending and irrigation directly contributing to growth, the government should consider reallocating spending from fertilizer subsidies to public goods (such as agriculture extension services, research and development, and irrigation) that could lead to faster sector growth.⁶

Recommendations

As Indonesia modernizes the agriculture sector and as income levels increase, it will be important to allocate resources based on a two-pronged strategy that maximizes spending 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:

- Reallocate public spending from subsidizing private inputs (fertilizer, seeds, and grants to farmers and farmers' groups) to providing agriculture and irrigation public goods and services.
- 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.

Notes

1. This *Economic Premise* is based on the results of the Indonesia Agriculture Public Expenditure Review, World Bank, 2009–10.

2. Evidence provided by a U.N. Food and Agriculture Organization research project conducted in 20 countries in Latin America shows that public spending in rural areas has a positive impact on agriculture growth (Allcott, Lederman, and López 2006). The study also shows that both the volume and the composition of spending matter. Assuming a fixed amount of spending in the agriculture sector, a large share of spending on subsidies to private inputs has a negative impact on agriculture growth, given the corresponding lower spending on the provision of public goods. López and Galinato (2007) find similar results, and they argue that the

positive effect of public spending on rural incomes is primarily dependent on the composition of spending. They estimate that a 10 percent reallocation from subsidizing private goods to providing public goods can increase per capita income from agriculture by 5 percent. In a related piece of work, Santos and Ortega (2006) show how the share of the budget allocated to subsidizing private inputs has a negative and significant impact on the efficiency of public spending.

3. National spending on agriculture includes central government spending on irrigation by the Ministry of Public Works and on agriculture by the Ministry of Agriculture. Subnational government spending on agriculture and irrigation is done by district and provincial governments and agriculture subsidies.

4. RASKIN (*Beras Miskin*) is not a subsidy to agricultural inputs, but primarily a program to provide subsidized rice for the poor. To the extent that it increases domestic demand for rice and is partly used to stabilize prices and therefore provide an incentive for increased rice production, it will also have an impact on rice production. In any case, we include it as an agriculture subsidy because the Ministry of Finance includes it; note, however, that it is not entirely a subsidy to agricultural production.

5. Different function specifications were considered, taking into account previous analyses of the impact of public spending in the agriculture sector. See, for example, López and Galinato (2007); Moreno-Dodson (2008); and Bayraktar and Moreno-Dodson (forthcoming).

6. For econometrics details, see Blanco Armas, Moreno-Dodson, and Gomez Osorio (forthcoming).

About the Authors

Enrique Blanco Armas is a senior economist and Camilo Gomez Osorio is an economist of the Poverty Reduction and Economic Management (PREM) Network, East Asia; and Blanca Moreno-Dodson is a senior economist of PREM, World Bank, Washington, DC. To learn more about PREM, please visit <http://www.worldbank.org/prem>.

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