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POLICIES AND PUBLIC INVESTMENTS TO PROMOTE SMALLHOLDER GREEN REVOLUTIONS IN AFRICA: LESSONS FROM ASIA

INTRODUCTION: Many parts of Asia have achieved impressive gains in agricultural productivity and poverty reduction over the past half-century. By contrast, sustained agricultural development remains elusive in most of Africa. Policy makers are struggling to find the answers but there is no consensus about what the right mix of policies and public investments are. Can African policy makers learn from Asia's green revolution? Conditions differ in many respects between Africa and Asia, as well as across countries within Africa, and the impacts of various investments and policies in Asia may not necessarily produce the same impacts in Africa. However, it is instructive to understand the mix of public investments and policies that helped many Asian countries achieve their smallholder-led green revolutions and to consider the potential lessons for Africa.

We draw from two studies analyzing the returns to public expenditures and policies. The first study, carried out by the Economist Intelligence Unit (EIU 2008), estimated the contribution of various types of public investments and strategies to agricultural growth and poverty reduction in six Asian countries: China, India, Indonesia, South Korea, Taiwan, and Vietnam. The second study, carried out by IFPRI (Fan et al 2007) provides an in-depth analysis of India to identify the returns to various types of public expenditures over a 40-year period.

MAIN FINDINGS: The EIU study highlights the primacy of policy and enabling environment in driving both agricultural growth and poverty reduction in most of Asia (Table 1). As stated by the report:

“In places such as Korea and Taiwan, land-to-the tiller reforms created a broad-based agrarian population with ownership over land and strong incentives to increase output. In China and Vietnam, increasing individual farmers' rights over their land and output, combined with agricultural market liberalization, substantially improved farmers' incentives and stimulated rapid growth in output and private investment. Indeed, policy and institutional reforms have been central to (arguably, the main sources of) agricultural growth in China and Vietnam because those countries had to overcome complete state control of the entire economy. But getting institutions and policies right also mattered a great deal in the other four Asian economies as well” (p. 7-8).

“Appropriate policy reforms not only bring about one-off efficiency gains...more importantly they improve incentives for private investment in resource conservation, technology adoption, innovation, and increased modern inputs application, all of which lead to higher steady-state rates of output growth” (p. 8).

“Policy and institutional improvements can also improve equity since administrative power over farmer behavior tended to favor the wealthiest and those with the best political connections, rarely poorer individuals or communities” (p. 8).

The EIU (2008) study contends that policy and institutional reform in Africa may not produce the same magnitude of benefits as in Asia because of

its view that African nations have already undertaken most of the major sectoral reforms enacted in Asia. However, food and input markets in Africa continue to be hampered by unpredictable state operations, trade barriers, and sudden entry and retreat from markets. If anything, state intervention in food and input markets appears to be on the rise. The high degree of policy uncertainty creates major market risks and impedes private investment from flowing into the agricultural sector to support smallholder farmers. In these ways, there is still a great deal to be gained from sectoral reform in Africa, not necessarily to liberalize private trade *per se* but to reduce the risks and costs imposed on private trade arising from unpredictable government actions. The policy environment will clearly influence the impact of public investments on agricultural growth and poverty reduction.

As shown in Table 1, other investments found by the EIU study to have high payoffs were: crop science R&D and investments in rural roads, electricity, health and education. These investments helped smallholders produce more food while also improving their access to markets and services. Resources invested in input subsidies and direct distribution of fertilizers and other agri-chemicals showed modest returns on average. Input subsidies played a greater role in irrigated areas where the combination of water control, improved seed varieties and fertilizer raised yields dramatically. Returns to subsidies were lower under rainfed conditions, especially in semi-arid areas.

The IFPRI study of India estimates the return to various types of government expenditures in terms of agricultural growth and poverty reduction. Moreover, this study estimates impacts at different periods in India's development path from the 1960s to 2000. As shown in Table 2, most public expenditures to agriculture in the 1960s generated very high returns to both agricultural growth and poverty reduction. During this period, India's green revolution was just starting to take hold, which might make this period particularly relevant for many African countries. Particularly high returns were generated from public investments in roads and education, which had estimated benefit-cost ratios of 6 to 9. Agricultural research investments and credit subsidies yielded benefits that were 3 to 4 times the amount spent. This was the period when improved seed varieties, fertilizer, and credit were being promoted as a high payoff technology package. Irrigation and power subsidies yielded

the lowest returns in this period, though returns to these subsidies were more than double spending. In the 1970s and 1980s, the returns to most of the subsidy programs declined though they began to account for a growing share of national budgets. Meanwhile, investments in agricultural R&D, roads and education provided the greatest payoffs in terms of agricultural growth. By the 1990s only agricultural R&D and road investments continued to yield estimated returns of more than 300 percent. Estimated net returns to irrigation investments and education were low but still positive, whereas credit, power, and fertilizer subsidies had negative net returns, i.e., a Rupee invested generated less than one Rupee of benefits (Fan et al., 2007). These findings are similar to those of Rashid et al (2006) who concluded that state subsidies in input and output markets played an important role in supporting the initial uptake of improved farm technologies in Asia, but that their return fell over time and that the subsidies have now become a major drain on the treasury while crowding out other public investments that could produce higher payoffs.

The ranking of public investments in terms of poverty reduction follow the same broad pattern as that for agricultural GDP growth. Spending on roads, agricultural R&D, and education provided the greatest poverty reduction impacts. These findings are consistent with evidence from Africa showing returns to investment in agricultural R&D over 20% per year (Oehmke and Crawford 1996; Masters, Bedingar, and Oehmke 1998). The economic assessment evidence strongly indicates that if the resources that were spent on crop science had been spent on something else, African economies would now be poorer, government finances would be in worse shape, food import bills would be higher, and more Africans would suffer from food insecurity.

Fertilizer subsidies are estimated to have been effective at reducing poverty in the 1960s and 1970s, but subsequently appear to have been highly ineffective (Table 2). Credit subsidies were effective in the 1960s and 1980s. As stated by Fan et al, "These results have significant policy implications: most importantly, they show that spending government money on investments is surely better than spending on input subsidies. And within different types of investments, spending on agricultural R&D and roads is much more effective at reducing poverty than putting money in, say, irrigation" (p. 18-19).

POLICY IMPLICATIONS: The findings of these two studies from Asia provide potentially important implications for promoting agricultural growth and poverty reduction in Africa. Although the regions differ in important respects, there are strong reasons to believe that the policy reforms and investments in R&D and infrastructure that generated high payoffs in Asia are likely to be crucial drivers of growth in most of Africa as well. The payoffs to most types of public investments will be greater in a policy environment conducive to private investment. As concluded by EIU (2008):

“Our assessment is that the interventions that proved most effective in Asia – policy and institutional reforms, an agricultural research revolution, major expansion of rural roads and irrigation, and improved rural financial services delivery – must likewise be the primary targets for new investments.....The specifics of the strategies will vary among countries and even among agro-ecologies within countries, and must be developed internally, albeit with external financial and technical assistance. But the broader patterns are clear” (p. 18).

Table 1. Summary of Analysis of Six Asian Economies’ Agricultural Growth Boom Periods

	Agricultural growth effects			Poverty-reduction effects		
	Median share of agricultural growth attributable to:	Median rank by total effect	Median rank by benefit/cost ratio	Median share of poverty reduction attributable to:	Median rank by total effect	Median rank by benefit/cost ratio
<i>Policy / institutional reform</i>	40%	1	1	30%	1	1
<i>Infrastructure</i>						
Rural roads	10%	3.5	3	15%	3	3
Irrigation	9%	4.5	4	8%	5	4
Electricity/health/education	9%	4	7	18%	2	4
<i>Agricultural inputs delivery</i>						
Fertilizer/seed/chemicals	10%	5	6	7%	6 (tied)	6
Agricultural credit/insurance	2%	6 (tied)	8	5%	6 (tied)	2.5
<i>Agricultural/ natural resource managmt research/extension</i>						
Ag./NRM research	15%	2	2	10%	4	2
Ag./NRM extension	2%	6 (tied)	4	5%	6 (tied)	2.5

Source: The Economist Intelligence Unit (2008).

Table 2: Returns in Agricultural Growth and Poverty Reduction to Investments and Subsidies, India, 1960-2000.

	1960s		1970s		1980s		1990s	
	returns	rank	Returns	rank	returns	rank	returns	rank
<i>Returns in Agricultural GDP (Rs produced per Rs spent)</i>								
Road investment	8.79	1	3.80	3	3.03	5	3.17	2
Educational investment	5.97	2	7.88	1	3.88	3	1.53	3
Irrigation investment	2.65	5	2.10	5	3.61	4	1.41	4
Irrigation subsidies	2.24	7	1.22	7	2.28	6	na	8
Fertilizer subsidies	2.41	6	3.03	4	0.88	8	0.53	7
Power subsidies	1.18	8	0.95	8	1.66	7	0.58	6
Credit subsidies	3.86	3	1.68	6	5.20	2	0.89	5
Agricultural R&D	3.12	4	5.90	2	6.95	1	6.93	1
<i>Returns in Rural Poverty Reduction (decrease in number of poor per million Rs spent)</i>								
Road investment	1272	1	1346	1	295	3	335	1
Educational investment	411	2	469	2	447	1	109	3
Irrigation investment	182	5	125	5	197	5	67	4
Irrigation subsidies	149	7	68	7	113	6	na	8
Fertilizer subsidies	166	6	181	4	48	8	24	7
Power subsidies	79	8	52	8	83	7	27	6
Credit subsidies	257	3	93	6	259	4	42	5
Agricultural R&D	207	4	326	3	345	2	323	2

Source: Fan et al., 2007

History suggests the necessity of productivity increases in agriculture: except for a handful of city-states, there are virtually no examples of mass poverty reduction since 1700 that did not start with sharp rises in employment and self-employment income due to higher productivity in small family farms (Lipton, 2005).

Making markets work for smallholder farmers will require actions from many different actors, both private and public, as well as from international financial and donor organizations. Our premise, however, is that the public sector role is decisive. If public sector policy choices do not reduce the currently high levels of risk and uncertainty in African agricultural markets, and if governments use their scarce resources in ways that do not provide greater investment incentives for the private sector, then there will be limited scope for private investment to provide smallholder farmers with the access to markets that they need. Financial markets will also stay away from African agriculture if the risks of investment remain very high relative to the returns. On the other hand, if African governments define their roles clearly, implement these roles transparently and consistently, and invest their scarce resources in ways that make the greatest contribution to agricultural growth and poverty reduction, then this approach is likely to leverage even greater private investment in support of smallholder agriculture. When the conditions are created for profitable and stable private investment, the private sector has in other parts of the world grown and responded as seen in much of Asia, and there is little reason to believe Africa is different. Hence, private sector investment patterns and the supply of bank financing for private investment, are largely *outcomes* of public sector behavior -- its policy choices, integrity of its institutions, and the ways it spends its funds through the treasury.

For these reasons, we conclude that there is no single or deterministic “future” of the small farm in Africa. The decisions made by governments primarily and international organizations secondarily will largely determine the future of smallholder agriculture in the region. Without renewed attention to sustained agricultural productivity growth, most small farms in Africa will become increasingly unviable economic and social units. Sustained agricultural productivity growth and poverty reduction will require progress

on a number of fronts, most importantly increased public goods investments to agriculture, a policy environment that supports private investment in input, output and financial markets and provision of key support services, a more level global trade policy environment, supportive donor programs, and improved governance. Subsidies, if they are focused, well conceived and implemented, and temporary, can play a complementary role but should not – based on the Asian evidence presented here -- be seen as fundamental to the process. Most of these challenges can be met; meaningful progress will start when the political will is mobilized to adopt the policies and public investments which substantial evidence shows have the greatest chances of driving sustainable pro-poor agricultural growth.

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