Investing in Agriculture to Overcome the World Food Crisis and Reduce Poverty and Hunger

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In many parts of the world, increased agricultural growth will play a key role in addressing the current world food crisis, in contributing to overall economic growth, and in helping to achieve the first Millennium Development Goal of halving the proportion of poor and hungry people by 2015 (MDG1). The challenge of meeting MDG1 under the current circumstances is considerable, especially in Sub-Saharan Africa (SSA).

Of the means used to promote agricultural growth, sound government spending can be one of the most direct and effective. This brief presents ranges of estimates of the costs involved using two different approaches. There have been numerous attempts to estimate the costs of achieving MDG1, mostly at the global or regional level, including the United Nations' Zedillo Report and studies by the World Bank and the United Nations Development Programme.

These estimates have varied widely, mostly because of different methodologies, assumptions, coverage, measures, and interpretations. The two primary methodologies used in these studies have involved unit costs and growth-poverty elasticities (determining the extent to which poverty declines as growth increases). There has been no consistent basis of analysis for the first method, and studies using the second have been limited by data availability.

We have attempted to address some of these issues by providing improved, research-based estimates of the global and regional investments required to achieve MDG1. Because this is a complex issue and each of the approaches mentioned above has distinct merits, we have decided to produce estimates based on both approaches to provide a fuller picture. Expanding on the two approaches, we also present estimates of the costs of financing the inputs required for accelerating agricultural production in SSA.

Approach 1: Public investment requirements based on alternative scenario simulations

The unit-cost approach calculates the incremental public investment requirements of changes in key drivers affecting agricultural growth under a baseline versus an MDG1 focused scenario using IFPRI's IMPACT model. The public investment drivers considered in this brief are agricultural research, irrigation, and rural roads (public financing of the use of inputs such as fertilizers and improved seeds is considered separately below).1 The estimates further assume continued policy reform and enhanced economic growth driven by the more rapid agricultural growth achieved through investments. The MDG1-focused scenario (a very-high investment scenario) assumes annual GDP growth of 3.31 percent compared to the baseline (3.06 percent), a 30-percent increase in livestock numbers, and a 60-percent increase in food-crop yield growth.

TABLE 1—Annual Total Agricultural Investment ($ billion in 2008 US$) Required to Achieve Significant Progress on MDG1 (Unit Cost/IMPACT Method) by 2015

	SSA	SA	EAP	LAC	MENA	DEVELOPING WORLD
Baseline Scenario						
Agricultural Research	0.65	0.71	0.21	1.93	0.42	3.92
Rural Roads	0.74	0.13	0.51	1.27	0.09	2.74
Irrigation	0.56	3.84	1.80	0.72	0.74	7.66
TOTAL	1.95	4.68	2.52	3.92	1.25	14.32
Very-High Investment Scenario						
Agricultural Research	1.83	1.54	3.18	4.06	0.99	11.6
Rural Roads	2.90	0.49	0.43	3.26	0.32	7.4
Irrigation	1.02	5.47	0.81	1.13	1.03	9.46
TOTAL	5.75	7.50	4.42	8.45	2.34	28.46

Note: Only countries and regions with baseline data for public agricultural research investment and conversion information from PPP (purchasing power parity) to MER (market exchange rate) are included: 9 in EAP, 5 in SA, 39 in SSA, 11 in LAC, and 7 in MENA; Central Asia was excluded due to sparse data.

Under the baseline scenario, total global annual agricultural investment requirements would amount to US$14.3 billion. Under the very-high investment scenario, requirements would basically double to US$28.5 billion per year (Table 1). The incremental spending required—the additional amount necessary to meet MDG1—would thus be US$14 billion for all developing countries.

Under the very-high investment scenario, SSA would require a total of US$5.8 billion per year or an additional US$3.8 billion annually, South Asia (SA) would require total annual spending of US$7.5 billion or an incremental amount of US$2.8 billion per year, East Asia and the Pacific (EAP) would require US$4.4 billion in total annual spending and an additional amount of US$1.9 billion per year, Latin America and the Caribbean (LAC) would require a total of US$8.5 billion or an incremental US$4.5 billion per year, and the Middle East and North Africa (MENA) would require total annual spending of US$2.3 billion or additional spending of US$1.1 billion per year.

To achieve MDG1, it would help to also invest in complementary services, such as secondary female education and access to clean water. Factoring in these two areas increases total global annual investment requirements from US$14 billion to US$32 billion under the baseline scenario, and from US$28 billion to US$53 billion under the very-high investment scenario. Total annual investments in SSA would increase from US$2 billion to US$5 billion under the baseline, and from US$6 billion to US$11 billion under the very-high investment scenario.

Approach 2: Public investment requirements based on growth-poverty elasticities

The second IFPRI study focuses solely on SSA, and uses growth-poverty and growth-public expenditure elasticities to estimate the resources required to meet MDG1 in SSA and three subregions. Many SSA countries have pledged to increase their government support to agriculture in order to achieve an annual agricultural growth rate of 6 percent, a goal that has been adopted by the New Partnership for Africa's Development through the Comprehensive Africa Agriculture Development Programme. As part of the Maputo Declaration of 2003, for example, many African heads of state agreed to allocate 10 percent of their government budgets to agriculture. However, questions remain as to how the resources should be allocated in order to have the largest impact on agricultural growth and poverty reduction, and whether the pledged resources will be sufficient to meet the 6-percent growth and MDG1 targets.

This approach first calculates the required agricultural growth rates using elasticities of poverty reduction with respect to agricultural growth, and then uses those rates to estimate the necessary public financial resources, using growth-expenditure elasticities. Because growth in the nonagricultural sector will also contribute to poverty reduction, through growth linkages with agriculture, the additional poverty reduction effects from this sector are also considered. The components of agricultural spending that are examined are agricultural administration, agricultural research and extension, irrigation, and small rural infrastructure such as unpaved feeder roads.

Using this methodology, SSA countries will need to boost their annual agricultural growth to 7.5 percent per year in order to achieve MDG1. To reach this target, government agricultural spending will have to increase to US$13.7 billion per year (Table 2).

If SSA countries fulfill their commitments to allocate 10 percent of their budgets to agriculture under the Maputo Declaration, the MDG1 target would require additional or incremental spending of US$4.8 billion per year. However, there is a large variation in investment requirements across SSA subregions.

In addition to government spending, use of inputs such as fertilizer and high-yielding seeds are required to achieve rapid productivity growth in agriculture. According to the

TABLE 2—Annual Total Agricultural Spending ($ billion in 2008 US$) Required to Meet MDG1 in Africa by 2015 (Growth–Poverty Elasticities Method)

	Sub-Saharan Africa	West Africa	East Africa	Southern Africa
Total	13.67	9.06	3.79	0.83
Additional/Incremental	4.77	2.77	1.96	0.04

International Fertilizer Development Center, fertilizer use is extremely low in many SSA countries, averaging 8.8 kilograms (kg) per hectare (ha). If fertilizer use gradually rises to 50 kg/ha, a level that has already been reached by most middle-income SSA countries and which is a target established by an African Fertilizer Summit (2006), total fertilizer use will increase by 5 to 6 times. Fertilizer prices in SSA are extremely high because of inefficient distribution systems and high transportation costs. Taking all this into account, the total cost of fertilizer and improved seeds required to achieve an agricultural growth rate of 7.5 percent is estimated at more than US$9 billion a year (Table 3).

Considering the current level and trend of fertilizer and seed use, the incremental cost of these inputs is about US$6.8 billion per year. It is unrealistic to expect farmers to pay this cost, or to have access to credit to facilitate market participation. Public-sector support seems to be necessary; however, a fertilizer subsidy program has to be designed in such a way that it avoids crowding out the private sector and distorting markets and farmers' incentives. A fertilizer voucher system designed to target the poorest 50 percent of farmers would likely have few such negative effects. If the subsidy component for these farmers is 60 percent of costs, the incremental public-sector cost (including operational costs) would be about $2.25 billion per year (Table 3, row 3).

Conclusion

Investing in agriculture is key to reducing poverty and hunger in developing countries and is an essential element in addressing the current food price crisis. Though numerous studies have attempted to estimate the costs involved in achieving MDG1, none includes agricultural growth requirements or quantifies the public resources needed to support that growth. The required growth and financial resources vary based on past progress in poverty reduction and the role of agriculture in the overall economy. Our analyses address some of these gaps by simulating required total and incremental agricultural spending using two different approaches. The estimates do not include the health and nutrition spending needed to address MDG1 in a comprehensive manner.

In sum:

- The global incremental public investment required—the additional amount necessary to meet MDG1—would be US$14 billion for all developing countries.
- In Sub-Saharan Africa, governments and development partners will need to increase their agricultural spending considerably in order to achieve MDG1. The estimated incremental annual investments required in SSA range from US$3.8 billion to US$4.8 billion according to our two estimates (with the latter being in addition to SSA countries committing 10 percent of their budget to agriculture).
- The incremental annual costs for a partly publicly funded input financing scheme that reaches the poorest 50 percent of farmers in Africa would amount to an additional US$2.3 billion per year.

TABLE 3—Annual Cost Estimate ($ billion in 2008 US$) of Fertilizer and Improved Seeds Required to Meet MDG1 in Africa by 2015

	Sub-Saharan Africa	West Africa	East Africa	Southern Africa
Total	9.14	3.81	3.01	2.31
Additional/Incremental	6.82	2.78	2.34	1.70
Financed by public sector	2.25	0.92	0.77	0.56

Note: Agricultural growth-to-fertilizer elasticity is about 0.2–0.3 in the literature. Setting elasticity at 0.25, fertilizer use has to grow at 10 to 40 percent annually across SSA, such that fertilizer use gradually increases from the present 10 kg/ha to 50 kg/ha by 2015. With a modest land growth rate of 2 percent a year, total fertilizer use required to achieve a 7.5 percent annual agricultural growth rate is estimated to be 8.5 million tons a year by 2015, from the present level of 1–2 million tons. The cost of fertilizer is much higher in SSA than in other regions, ranging from 2 to 4 times the cost in developed countries.

sector despite wide.-ranging reforms? Two factors underpin this moderate increase in the value of SSA agricultural exports. First, recovery in agricultural production since 2000 does not appear to be that widespread. And although there has been some expansion in SSA agricultural exports, the share of the region in global exports has remained rather small, with agricultural exports becoming concentrated in a small number of countries. Over the period, 2002-2005, just three countries accounted for about 56 per cent of total SSA agricultural exports, the largest exporter being South Africa, followed by Cote d'Ivoire and Ghana. Second, the modest increase reflects the continued dependence of SSA on traditional non-fuel primary commodity exports such as coffee, cotton cocoa, tobacco, tea, and sugar[1]. These traditional commodities remained the top exports of the region in value terms over a period of five years: coffee, cotton, tobacco and tea in 2000; and cocoa, cotton, sugar (and wine) in 2005. Most importantly, in 2005, fewer countries exported the top four products (see table 1).

There was a steady increase in the export volumes of these traditional commodities from about the mid-1990s. The fact that this did not translate into a higher value of exports until after 2000, reflects the low prices of these commodities on the world market over this period. These commodities have been afflicted by high price volatility, and until about 2002, by falling prices[2]. During the 1970s, 1980s and 1990s, the volatility in terms of trade for SSA exports was about two times that for East Asian exports and nearly four times that experienced by industrial countries (UNCTAD, 2003).

This continuing dependence on traditional commodity exports[3] also reflects the region's inability to tap fully into the international trade in market-dynamic (non-traditional) commodities, such as horticulture and processed foods. These products are highly income elastic with lower rates of protection in industrial and large developing countries (UNCTAD, 2003).

During 2000-2005, for instance, no African country featured among the world's 20 leading exporters of processed food, which include countries such as Brazil, Argentina, Mexico, Thailand, India, and Indonesia. South Africa, which was the largest exporter of these products in the region, had a global market share of less than one per cent. Mauritius, the second largest exporter of processed products in SSA came a distant 59th in global rankings with only a 0.2 per cent market share. And in the case of semi-processed products, South Africa was the only SSA country among the top 20 exporters during 2000-2005. There were no SSA countries among the leading exporters of processed products over the same period (OECD, 2008a).

This notwithstanding, Africa has made some progress in diversifying its international agricultural trade, although the pace is slow. A few countries have made inroads into the international trade in horticultural products, but only South Africa made it to the list of the top 20 horticultural exporters in 2000-2005, with an average market share of 2.3 per cent. Morocco which was among the top 20 exporters during 1985-1990 had dropped out of the group in 2000-2005, as its market share declined to just over one per cent. Two other African countries export some considerable amounts of horticultural products. These are Kenya and Côte d'Ivoire but each has a share of less than one percent of the global market (OECD, 2008a). In recent years, a few countries such as Ethiopia, Ghana, Uganda, and Zambia have also increased their exports of these products, although the volumes are quite small in the majority of cases (except probably in the case of Ghana) compared with the volumes of their traditional export commodities.

Table 1. SSA: Top four African exports, 2000 and 2005

Rank	2000				2005			
	Product	No of countries	Value $m	% of total exports	Product	No of countries	Value $ m	% of total exports
1	Coffee	22	788	8.6	Cocoa	11	2,500	16.6
2	Cotton	22	688	7.8	Cotton	19	779	5.2
3	Tobacco	13	628	7.1	Sugar	17	726	…
4	Tea	22	614	7.0	Wine	18	603	…

Source: Extracted from OECD, 2008a, p.31.

… not available

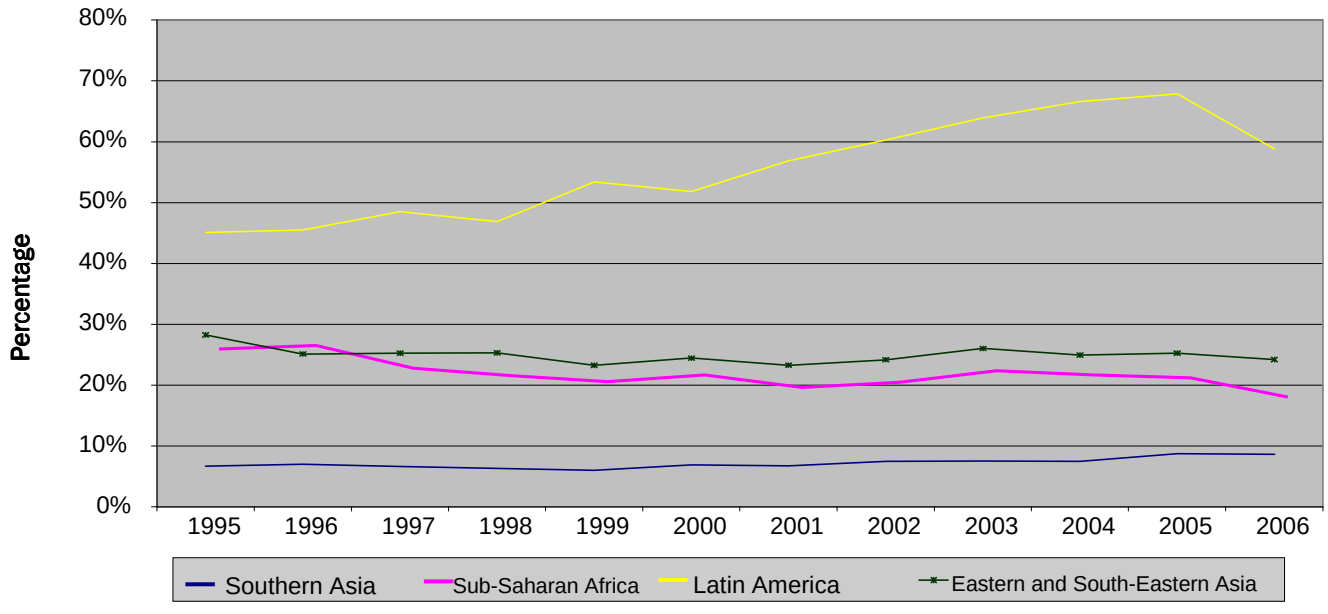
On the other hand, Africa's share in world agricultural imports decreased steadily from 5.4 per cent in 1985 to 3.2 per cent in 2006. This could be explained, in part, by the fact that global trade in agriculture is no longer dominated by the traditional bulk commodities. These are the least dynamic in terms of export growth, and their share in total agricultural exports has declined substantially. Most developing countries that remained commodity-dependent in 2003-2005, two-thirds of which are in Africa, have thus been struggling to defend their historical positions in the international market. In the last 25 years, trade in horticulture and processed food has grown at double the rate of traditional bulk commodities. Thus, these products are now comparable to non-agricultural products in terms of export growth. Indeed, the continent's potential in commercial agriculture remains largely untapped with a fledgling agribusiness sector in most countries (OECD, 2008a).

The substantial increases in the value of agricultural exports of both the East and South Eastern Asia and Latin America over the period, 1995 to 2006, reflect the changed composition of their exports towards these high value exports. Moreover, significant increases in export volumes have been attained on the back of increased productivity in traditional commodity exports due to intensive methods of farming. As discussed later, technological advances that have led to improved productivity by some old agricultural exporters in Latin America and East Asia, and by some new exporters in Asia during the 1970s and 1980s largely by-passed SSA. The region has not benefited from productivity gains, which have been attained for a variety of crops, including corn, soybeans, sugar and rice.[4] These gains coupled with farm mechanization have resulted in significant increases in production by some commodity exporting countries, such as Brazil and Vietnam. And, some of these countries have emerged as more efficient producers than Africa in some traditional agricultural commodities, such as cocoa (Malaysia), and coffee (Indonesia and Vietnam) (UNCTAD, 2003a; see also Havnevik, et. al., 2007).

The above factors appeared to have contributed to the steady decline in the proportion of total agricultural production traded in SSA from around 27 per cent of production in 1995 to just below 20 per cent a decade later. Of the other developing regions, Latin America recorded a sizeable increase in the proportion of its exported agricultural output from under half to about two-thirds of its total agricultural output. However, there was no change in the ratio of agricultural output exported by the other two developing regions (Fig. 3).

It is apparent from the discussion above that there have been some positive developments in Africa's international trade in agriculture following trade liberalization. First, there have been some expansions of Africa's exports. However, this was not reflected in the value of the region's export until after 2000 because of the low commodity prices prior to that period. Second, there has been some

Figure 3. Proportion of agricultural output exported (percentage)



Source: UNCTAD, 2008a