

Fertilizer Marketing in Eastern and Southern Africa

Policy Synthesis #1

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Background: Broad-based agricultural productivity growth is likely to be a pre-condition for sustainable poverty reduction and improved living standards in most of sub-Saharan Africa. Achieving rapid agricultural productivity growth in Africa will require major increases in fertilizer use in most of the continent's major farming areas. Countries in the region have recently undertaken a number of alternative approaches for achieving sustainable increases in fertilizer use and there is much to learn from a comparative assessment of recent experience.

Objectives: This report reviews the experiences in promoting smallholder farm productivity and national food security for Ethiopia, Kenya, Malawi, Tanzania, Uganda, and Zambia, and identifies a number of guidelines, options, and challenges for achieving sustainable growth in fertilizer use.

The point of departure of this report is that the main goals of agricultural policy are to improve smallholder farm productivity, income growth, poverty reduction, and national food security. Raising fertilizer use is an intermediate goal in achieving these objectives. Experience has shown that raising fertilizer use does not automatically contribute to smallholder productivity, poverty reduction, or national food security, although there is a general consensus that raising fertilizer use in a cost-effective way is certainly essential to meeting these objectives. The paper aims to identify strategies for *cost-effectively* promoting fertilizer use, so that scarce government resources spent on fertilizer promotion maximize their payoffs in terms of achieving the objectives of improving smallholder farm productivity and income growth, and national food security.

The six countries have pursued a variety of policy approaches with respect to fertilizer and grain marketing (Figure 1). In the top left quadrant are Malawi and Zambia, where the state is heavily involved in both fertilizer and output markets. According to national survey data, roughly 55% and 34% of smallholder farmers in Malawi and Zambia use fertilizer, with mean application rates between 24 and 29 kg/ha. In the bottom left quadrant are Ethiopia and Tanzania, which have relatively little state involvement in output markets and are directly or indirectly involved in the distribution of fertilizer. In the bottom right quadrant are Mozambique and Uganda, where fertilizer use rates are very low. Kenya is a country that up to 2009 had relatively liberalized fertilizer markets and continued state involvement in supporting and stabilizing maize prices.

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Figure 1: Country categorization of fertilizer and food market policy conditions, 2005-2008.

		Fertilizer markets	
		Direct state interventions	Relatively little direct state intervention
Output markets	Direct state intervention	Malawi – 55% (29 kg/ha) Zambia – 34% (24 kg/ha)	Kenya – 70% (34 kg/ha)
	Relatively little direct state intervention	Ethiopia – 25% (17 kg/ha) Tanzania – 12% (9 kg/ha)	Mozambique – 5% (4 kg/ha) Uganda – 6% (2 kg/ha)

Percentage of farmers using fertilizer (2005 mean kg/hectare application rate)

Source: FAO.

Findings: The report highlights three main findings. *First, national statistics indicate that fertilizer use is rising, often impressively, in each of the six countries analyzed* (Figure 2). Fertilizer use in Ethiopia and Kenya has virtually doubled between the early 1990s and late 2000s (ignoring the 2008 season in Kenya which was unusual due to civil disruption).

In Uganda and Zambia, fertilizer trends are unstable and apparently subject to extreme swings due to programme initiatives followed by withdrawal and subsequent programme revival.

A second major finding concerns the importance of considering fertilizer promotion holistically. The experience of the Sasakawa-Global 2000 initiatives in numerous African countries shows that when smallholder farmers have access to improved seed and fertilizer inputs and the know-how about complementary crop management practices, they are fully capable of generating impressive yield gains. But once the program withdraws, the hard questions arise: how will farmers continue to acquire the improved seed and fertilizer? Who will supply these critical inputs to them? Who will supply the credit to enable the poorest households to afford these inputs? Who will support farm-gate grain prices after the aggregate supply expansion causes prices to crash? Resolving these issues remains a major challenge in many of the countries assessed in this report, highlighting the importance of an approach that considers output markets, credit, improved seed, agronomic management, and fertilizer promotion holistically.

Therefore, while raising fertilizer use in the region is essential, achieving it will require a range of government actions, many of which are outside the realm of fertilizer marketing per se. Complementary public investments in crop science (e.g., more fertilizer-responsive and water stress-tolerant seed varieties), road and port infrastructure, provision of extension services and marketing management support for farmers, and basic education all appear to have high payoffs for sustainable crop productivity growth. Although many Asian countries implemented fertilizer subsidies in the 1960s and 1970s, this does not imply that fertilizer subsidies produced higher returns than other types of expenditures. Using data on public investments in each state in India, Fan (2007) finds that each dollar spent on fertilizer subsidies had a smaller impact on agricultural growth and poverty reduction than many other types of public investments. Among the eight types of investments considered, agricultural research and development, road building, and education consistently provided the highest returns in terms of growth and poverty

reduction. As show in Table 1, these types of investments had very high payoffs in terms of both agricultural growth and poverty reduction in India's green revolution successes during the 1960s to 1980s.

Figure 2: Trends in Fertilizer Consumption.

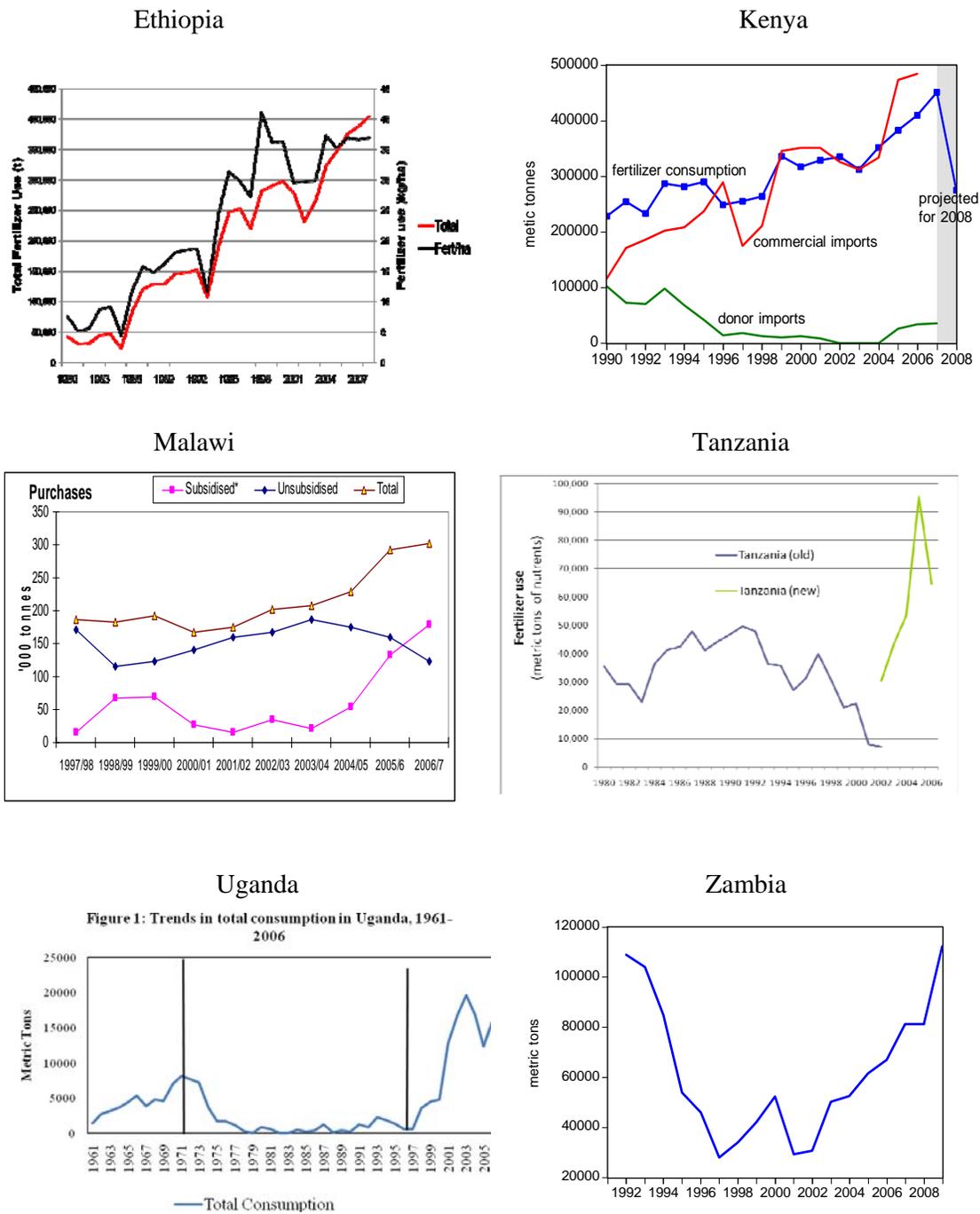


Table 1: Returns in Agricultural Growth and Poverty Reduction to Investments and Subsidies

	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

The findings in Table 1 combined with the case study experiences in the region compellingly demonstrate the importance of productivity-enhancing public investments combined with holistic system-wide coordination of input and output value chains for achieving sustainable growth in fertilizer use by smallholder farmers.

Third, getting sustained growth in fertilizer consumption involves building farmers' effective demand for fertilizer, in order to make its use profitable. In some areas, profitability may be “kick-started” by using targeted “smart” input subsidies designed to improve profitability in areas where the commercial networks are not yet sufficiently developed. A discussion of subsidies follows below. Even apart from subsidies, there is great scope for government action to raise the effective demand for the input by taking steps to overcome key constraints that currently limit its profitable use by small-scale farmers. These include:

1. Government should take direct steps to identify the most fertilizer responsive seed varieties for each agro-ecological region and pro-actively encourage the distribution of these varieties to smallholder farmers. Especially in semi-arid areas, there may be a need for direct government action to help smallholders gain access to productive new technologies appropriate for their needs. Lipton (2005) and Bhagwati (2005) propose performance contracts between donors and international seed companies to achieve specific outcomes, such as developing improved maize varieties that are stress-tolerant and yet high-yielding and responsive to fertilizer. Such innovations may help re-focus and harness the energies of the private agricultural research industry, which currently do not have great commercial incentive to focus on farmers in semi-arid areas with little effective demand.
2. There is typically a uniform recommendation on fertilizer application levels in these countries. Research shows, however, that optimal fertilizer application rates vary

greatly according to agroecological and market condition. Official application rates are often unprofitable in areas where lower application rates are profitable (e.g., Xu et al., 2009; Duflo et al, 2008). In many cases, improved soil and organic matter are needed before fertilizer use becomes profitable (Marenya and Barrett, 2009). Government in collaboration with the private sector should develop fertilizer application recommendation domains that are appropriate to local conditions, and then work with the extension service to publicize improved new recommendation rates to smallholder farmers in each area. Emphasis should also be given to publicizing the benefits of using conservation farming techniques where appropriate.

3. Given that fertilizer prices are sensitive to transportation costs, it is recommended that governments determine where the highest payoffs from increased road, rail, and/or port investments could be achieved, and consider implementing these investments to make fertilizer use by small-scale farmers more profitable. Further investments in rural electrification and communication services are instrumental in the establishment and expansion of existing smallholder cash crop production schemes.
4. Access to credit to allow low-income farmers to afford to use fertilizer on food crops is a major problem in virtually all of Africa, primarily because, unlike some cash crops, input suppliers cannot be assured of recovering their loans by acquiring farmers' surplus production. However, the case of Kenya shows that solid progress can be made in improving small farmers' access to credit by their participation in cash cropping schemes for tea, sugar, and, especially in earlier times, coffee. Farmer participation in these cash crop marketing arrangements has facilitated their access not only to inputs for these cash crops but also for fertilizer use on food crops (Jayne, Yamano, and Nyoro, 2004). The outgrower companies are able to recover the credit disbursed for food crop inputs by deducting these loans from the sale of the farmers' cash crop, as they do for the cash crop inputs. In this way, Kenyan smallholders' access to credit for fertilizer use on food crops has come as a direct result of historically hospitable investment conditions for cash crop marketing and processing, as has been the case for tea, sugar and, especially in earlier times, coffee. However, vibrant integrated cash-crop marketing schemes do not operate in many areas of the region, and in many cases there may be little alternative in the short- and medium-run to overcoming the poorest smallholders' access to credit other than targeted input or credit programs of some kind.
5. Creating a more level playing field between agents of government programs and non-agent private companies will lead to greater incentives for new entry by other firms and will discourage the potential for non-competitive practices. Government programs should complement and not compete with non-agent private sector, lest at the end of the day the structure of the fertilizer market is more concentrated than when government programs began. Tanzania offers a potentially innovative model for study and possible replication in this regard.
6. To facilitate effective preparation and planning by the private sector, government should make clear statements backed by consistent action about its on-going and intended operations in the fertilizer market. In several cases, fertilizer shortages occurred because the government announced a new programme, causing importers to withhold new orders, only to find that delays in the decision-making process caused government-imported fertilizers to be unavailable in time for planting. More generally, the private sector is not likely to participate in fertilizer importation and distribution if there is some risk of competition with subsidized fertilizer.

7. Study the potential for local production of fertilizer to reduce costs to smallholder farmers. While previous assessments indicated that local production of fertilizer would generally cost more than the cost of importing it, such analysis may need to be updated in light of likely changes in world fuel, transport, and mining costs over the coming years.
8. To facilitate the smooth passage of fertilizer at ports and borders, it is recommended that government should negotiate for favorable terms for handling an inland country's fertilizer cargo at shipping ports through Joint Permanent Commissions (JPCs) and regional bodies.

What about fertilizer subsidies? The existence of acute poverty and hunger, exacerbated by unstable and sometimes very high food and fertilizer prices, cries out for an immediate response. “Smart” fertilizer subsidy programs in Africa are potentially attractive because they can raise food production and thus reduce hunger in the short run. Income gains transferred to farmers through the subsidy are expected to result in greater savings and investment in productive assets, contributing to longer-run growth. In addition, income transfers to farmers address the social and political objectives of poverty alleviation and improved equity.

However, achieving these benefits depends greatly on how the programs are implemented. In Malawi, for example, the design and implementation of the Agricultural Input Support Programme has changed somewhat each year since 2005/06. Detailed analysis of Malawi's subsidy program, often heralded as a major success story, shows benefit-cost ratios that fluctuate greatly from year to year, reaching an average high of 1.54 in 2007/08 to an average low of 0.94 in 2008/09 (Dorward and Chirwa, 2009).

Several caveats should be considered before implementing fertilizer subsidies:

1. As a tool for increasing overall agricultural productivity, especially for small, poor farmers, fertilizer subsidies have a questionable record. Long experience with input subsidy programs in Africa is not encouraging on several points:¹ (a) there is very little evidence from Africa that fertilizer subsidies have been a sustainable or cost-effective way to achieve agricultural productivity gains compared to other investments, (b) there are no examples of subsidy programs where the benefits were not disproportionately captured by larger and relatively better-off farmers, even when efforts were made to target subsidies to the poor,² and (c) there is little evidence that subsidies or other intensive fertilizer promotion programs have “kick-started” productivity growth among poor farmers in Africa enough to sustain high levels of input use once the programs end.³

¹ Morris et al. (2007, 103) summarize by saying: “the weight of empirical evidence now show(s) that fertilizer subsidies are likely to be inefficient, costly, and fiscally unsustainable.”

² The logical response is to call for better targeting of future input subsidy programs. However, Dorward et al. (2008, section 7.2.3) includes an illuminating discussion of the practical difficulties involved in targeting subsidized fertilizers to poor households, including lack of information on who the poor households are, and unwillingness of some communities to exclude any households from receiving subsidized fertilizer. The daunting variety of difficulties described here makes it hard to be optimistic about the prospects for significantly improved targeting.

³ For example, Malawi and Zambia have had almost continuous fertilizer subsidy programs each year for the past several decades even during the so-called liberalization process (e.g., see Dorward et al., 2008; Jayne et al., 2002).

2. In the high potential areas of Kenya, Zambia, and Malawi, many if not most households use fertilizer regularly. In less stable production zones, low or no fertilizer use by many smallholders is explained not just by credit constraints that limit acquisition, but also by the risk of crop failure, with resulting financial losses. Some crops that are important in the farming systems of semi-arid areas, like millets and sorghums, are generally not very fertilizer responsive. Hence, low levels of fertilizer use in semi-arid areas do not necessarily imply sub-optimal usage of fertilizer.
3. Hence, a balance is needed between interventions to address short-term supply shortages and avoid widespread hunger vs. investments and policies to drive growth and lift poor households out of the poverty trap in which they are caught. Currently, the governments of Malawi and Zambia devote at least 60% of their agricultural budgets to input and crop marketing subsidies, leaving relatively little for the long-term investments required for sustainable reductions in poverty and hunger.

Guidelines for the implementation of fertilizer subsidies:

If the decision is made to implement input subsidies, the experiences of Zambia and Malawi provide several practical guidelines (guidelines 1 through 3) for how to maximize their effectiveness in meeting important national objectives. Guidelines 4 through 7 follow from more general evidence in the region.

1. ***Use input vouchers that can be redeemed at local retail stores rather than direct distribution*** in order to maintain or improve the capacity of the private sector input delivery system.
2. ***Involve a wide range of fertilizer importers, wholesalers, and retailers in the input voucher scheme***, even if it entails additional logistical costs. Providing tenders to only 2-3 firms to import fertilizer can entrench their position in the market, cause other firms to cease making investments in the system or drop out altogether, leading to a more concentrated input marketing system and restricted competition when the input subsidy program comes to an end. A system that allows farmers to redeem coupons at the full range of existing independent agro-dealer retail stores will promote additional investment in remote rural areas where it is most needed. By contrast, failure to involve the small rural retailers may lead many of them to stop carrying fertilizer, as was the case in Malawi after the 2005/06 season, leading to erosion rather than development of a private retailing system.
3. ***Before deciding to target the input vouchers***, carefully consider the objectives of the targeting and the practical feasibility and costs of implementing a targeted program, including personnel costs, time requirements and potential delays, leakage, and displacement of commercial sales by subsidized inputs.
 - a. If the objective is to increase total output, then the inputs need to reach farmers who can use them efficiently and on a large enough area to generate significant gains in total output. Evidence indicates that a high proportion of non-poor farmers are able to acquire fertilizer through markets so spending scarce government resources to provide them with discounted fertilizer will largely substitute subsidized fertilizer for commercial fertilizer, adding relatively little to overall fertilizer use or crop output. In some cases, small farmers may also use fertilizer more efficiently than larger farmers.

- b. If the objective is to alleviate poverty, or to overcome liquidity constraints for poor farmers who would otherwise be unable to purchase fertilizer, then it must be possible to identify poor farmers, and socially acceptable to channel vouchers to them, at a reasonable cost including leakage. Assisting low-income households to acquire fertilizer especially in a high food price environment may make the difference between their ability to eat and going hungry. Providing crop production support to relatively asset-poor households also contributes importantly to equity and social protection objectives,
 - c. If effective targeting does not seem feasible or achievable at an acceptable cost, then a small universal voucher program would be worth considering. For example, a program designed to provide all farmers with inputs for 0.2 ha would primarily benefit small farmers while at the same time limiting the displacement of commercial purchases by larger higher-income farmers, some degree of which might occur anyway under a program that fails to target small farmers successfully.⁴
4. ***Address infrastructure and input supply constraints as well as improving procurement efficiency*** (joint procurement arrangements and regional procurement hubs). This will help achieve the goal of enhancing farm-level fertilizer supplies at a lower price. Facilitating the movement of fertilizers across borders (removing customs duties and export taxes) will also contribute to overall improvements in supply efficiency.
 5. ***Facilitate private sector partnerships with farmers***, such as through contract farming where conditions are suitable, would go a long way toward reducing the financial burden on government.
 6. ***Strengthen farmers' effective demand for fertilizer*** by making fertilizer use profitable and by building durable input markets and output markets that can absorb the increased output without gluts that depress producer prices. This involves two major commitments from government:
 - a. To increase farmers' demand for fertilizer, governments should invest in rural infrastructure, efficient port facilities and standards of commerce to reduce the costs of distribution; fund agricultural research to produce seeds that respond to fertilizer; determine and disseminate fertilizer use recommendations that are appropriate for different areas (as opposed to one blanket recommendation for an entire country); and nurture the development of rural financial systems, market information systems, institutions for contract enforcement, and telecommunications to attract new investments by commodity marketing firms. These "public goods" investments, often considered outside the scope of fertilizer marketing policy, nevertheless strongly affect the demand for fertilizer and hence whether sustainable markets for fertilizer can arise.
 - b. To build durable input and output markets, governments should establish a supportive policy environment that attracts local and foreign direct investment. The case of Kenya shows how a stable policy environment from the early 1990s to 2007 induced an impressive private sector response that has helped to make fertilizer accessible to most small farmers. Importantly, this has involved

⁴ The option of a small universal subsidy program is discussed in Imperial College et al. (2007). See also Chinsinga (2005) for a discussion of the earlier experience in Malawi with universal and targeted input subsidy programs.

reforms to the financial market (elimination of foreign exchange controls) as well as to fertilizer and crop markets. In other countries, the implementation of large subsidy programs has inhibited the type of private investment response seen in Kenya, due to the risk of huge losses that subsidy programs inflict on commercial input dealers.

7. **Increase fertilizer use efficiency** by promoting farmers' use of improved crop management practices such as crop rotation with legumes, changes in density and spacing patterns of seeds and placement of fertilizer and seeds at planting, improved soil organic matter, early planting, timely weeding, applying fertilizer in response to rainfall, water harvesting, and other conservation farming methods.

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