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## DEVELOPING CEREAL-BASED DEMAND FOR FERTILIZER AMONG SMALLHOLDERS IN SOUTHERN AFRICA: LESSONS LEARNED AND IMPLICATIONS FOR OTHER AFRICAN REGIONS

By

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**BACKGROUND:** There is growing concern about low farm incomes and stagnant or declining agricultural productivity in Sub-Saharan Africa. Poor soil quality, due in large part to low levels of fertilizer use, is considered by many to be one principal reason for these problems.

In much of Sub-Saharan Africa, demand for fertilizer was developed based on “cash-crop” systems, usually based on non-cereal export crops — cotton, tea, coffee, fruits, vegetables, and tobacco. In these systems, there is credit for fertilizer and profitable and stable outlets for the product for both small- and large-scale farmers. Non-cereal crops, however, occupy only a small share of land compared to cereals in most African countries, and are thus not motors for broad increases in fertilizer use to raise smallholder productivity and food security. Moreover, the Green Revolution in Asia was due in large part to intensification of cereal rather than export crops. To date, however, only a few countries (Nigeria, Kenya, Zimbabwe, Zambia, and more recently Ethiopia) have developed national programs to promote fertilizer use on smallholders’ cereal fields.

**OBJECTIVES AND METHODS:** Our research focuses on two of the above cases — Zambia and Zimbabwe. We believe that these cases hold great interest for other African countries currently contemplating alternative policies to stimulate use of fertilizer on small farms.

The principal objective of our research was to document, compare, and evaluate changes in the structure, conduct, and performance of the fertilizer sectors in Zimbabwe and Zambia, and to draw implications for other countries in Africa attempting to increase fertilizer use on small farms. The research covers the past three decades, over which fertilizer policies and fertilizer systems changed substantially.

The research draws on an extensive review of published and unpublished documents plus interviews conducted by Dr. Rusike during 1996 and 1997 with managers of fertilizer companies and agribusiness consulting firms, researchers and policymakers, representatives of farmer organizations, and field officers of non-governmental organizations (NGOs).

**POLICIES, STRUCTURE, AND CONDUCT OF THE FERTILIZER SYSTEM, 1970s TO THE PRESENT:** Fertilizer research, extension, and distribution during the colonial and immediate post-colonial period focused on large-scale and selected small-scale farmers especially in areas with higher rainfall. Only a few types of fertilizer were marketed, and extension services recommended uniform and high rates of fertilizer application that were often not profitable for typical smallholders.

In the 1980s, governments in both countries used input and credit subsidies and public market infrastructure to improve smallholder access to fertilizer to increase maize production to improve national food security and farm incomes via intensification and



commercialization of smallholder cereal production. The new policies included: (a) the creation of a countrywide network of subsidized depots where maize had a guaranteed market and fertilizer and seed were readily available; (b) pan-territorial and pan-seasonal pricing for maize and fertilizer; (c) price subsidies for fertilizer; and (d) input loans to smallholders at negative real interest rates, with lax enforcement of repayment.

But the public support system was not fiscally sustainable due to the high cost of subsidizing the various components and the high rates of default for repayment of input loans. Despite its success in raising smallholder fertilizer use, the 1980s policies created inefficiencies and uneconomic patterns of maize production. (Pan-territorial pricing made it artificially profitable to produce maize in remote areas with high transport costs.)

Reforms were thus instituted in the 1990s as part of the Structural Adjustment Programs. Import and distribution of fertilizer were gradually liberalized and privatized, public marketing depots were cut, and maize and input prices were partially or fully decontrolled.

During the 1990s, the governments also took measures to deal with challenges related to the transition to a liberalized fertilizer market. To deal with competition from South African companies, perceived as engaged in predatory marketing, the Zimbabwe government continued protection (via tariffs and regulations) of the fertilizer market — spurred by lobbying by national companies. To deal with the effects of drought that undermined fertilizer demand at the outset of reforms, the Zimbabwean government distributed free fertilizer and seed to smallholders in its Drought Relief Recovery “Crop Pack Program” from 1992 to 1997. To deal with the potential problem of inadequate access to fertilizer credit after the elimination of the public rural credit system, in 1994 the Zambian government began financing credit through Cavmont Merchant Bank and Société Générale de Surveillance. These banks acted as on-lenders to private dealers and stockists, who in turn lent fertilizer to farmers. The system has worked poorly, however, with low recovery rates (in 1996, a mere 27 percent.)

Largeholders have reacted to the loss of the subsidies and maize market guarantees by shifting from maize toward fruit, vegetables, and tobacco. Fertilizer companies have responded to these shifts by providing blends, and high solubility and high-analysis fertilizers. The latter cost less to transport.

Although the response of fertilizer companies to the needs of the commercial sector has been more rapid and complete than that to semi-subsistence smallholders, some firms are starting to compete for the (cereal-based) smallholder fertilizer market via innovations that address smallholder market problems. Following are examples: (a) small-medium trading firms are setting up in smallholder areas where they can get to know clients and establish local links for maize and fertilizer trading and credit. In Zambia, some provide fertilizer on credit through the government-subsidized scheme, with repayment rates of up to 80 percent; (b) the South African company, Omnia, has set up a maize-for-fertilizer barter system in Zambia to redress limited credit availability and low repayment; and (c) Zimbabwean manufacturers experimented with the marketing of low-analysis fertilizers such as partially acidulated phosphates (from rock phosphate) for the smallholder market.

NGOs and farmer organizations are undertaking pilot schemes to raise smallholder access to fertilizer. For example, the CARE AGENT program identifies village-level stockists, provides them with technical training and guarantees short-term credit. CARE then aggregates orders from field agents and tenders them for bid. Orders are filled and delivered by local suppliers.

**PERFORMANCE CHANGES OVER THE 1980s-1990s:** Total fertilizer use rose in both countries in the 1980s, but then fell in the 1990s, especially in Zambia. In **Zimbabwe**, total fertilizer use per year declined slightly from roughly 510,000 tons in 1981-1989 to 490,000 tons in 1990-1996. In **Zambia**, total fertilizer use per year averaged 210,000-230,000 tons from 1980 to 1992. After the general liberalization and market subsidy cut in 1992, the yearly average dropped significantly to 160,000 tons.

The smallholders’ share of total fertilizer use declined in Zambia (70 percent of the total in the 1980s, 60



percent in the 1990s). It stayed steady between the two periods in Zimbabwe (at about 25 percent), but would have declined in the 1990s had it not been for fertilizer aid.

The reasons for the faster fall in Zambia's fertilizer use are: (a) the smallholder share in total fertilizer use is much higher in Zambia; (b) Zambia has poorer roads (and thus higher transport costs) in smallholder areas; and (c) the maize/fertilizer price ratio stayed relatively stable over the two decades in Zimbabwe, but in Zambia fell from an average of 0.7 to 0.4 from 1980-1985 to 1990-1995.

**LESSONS:** The current struggles of the governments and the private-sector actors in Zambia and Zimbabwe to address the constraints to increasing the smallholder, maize-based market for fertilizer should be of great interest to other African countries. Key lessons follow. (1) Efforts to increase fertilizer use on small cereal farms in Africa are plagued with **fundamental problems** such as climatic risk; a dearth of technology packages that are farmer tested to be profitable and risk-decreasing, especially in less-favorable agroclimatic zones; lack of technical/management skills and information on application rates and agronomic methods to increase the efficiency and profitability of fertilizer use; high transport costs; underdeveloped credit markets; and risky output markets. **Sustainable strategies for increasing fertilizer use must address these fundamental problems.**

(2) It is not surprising that smallholder fertilizer use rose dramatically in Zambia and Zimbabwe during the 1980s because the fundamental problems were addressed through state intervention and subsidy, using methods common in "cash crop schemes" elsewhere (guaranteed output markets, subsidized inputs and credit, and extension). It was also crucial that an improved technology package was available (improved varieties with good fertilizer responsiveness and strong consumer demand) although this package worked best in more favorable agroclimates. But the subsidies and guaranteed markets proved to be fiscally unsustainable.

(3) It is also not surprising that fertilizer market liberalization in the 1990s was not a panacea. Despite more business competition for the largeholder fertilizer market, smallholder fertilizer purchases dropped because **the fundamental problems were not resolved by liberalization alone.**

(4) Fertilizer manufacturers and traders know that the persistence of the fundamental problems undermines their profitably serving the smallholder market. They have taken initial steps to address those problems — for example, fertilizer barter schemes to obviate credit problems; new, cheaper products to fit smallholder needs; private extension efforts; and location in smallholder areas.

(5) NGOs and farmer organizations recognize that business efforts will not yet be enough to substantially increase smallholder access to fertilizer. Those organizations have developed pilot projects to train farmers, and serve as their intermediaries with fertilizer firms to reduce the risk of credit and transactions.

(6) There are, however, crucial actions for governments to undertake — to create conditions that develop the incentives and capacity of the private sector to invest in building fertilizer markets accessible to smallholders. These public actions are discussed below.

**POLICY RECOMMENDATIONS:** The most promising roles for a government action center on addressing the fundamental problems discussed above; that will help fertilizer firms as well as farmers come to a mutually beneficial market solution. A secondary role involves regulating the emerging market to best serve smallholders needs. Specifics follow.

**(1) A poor infrastructure in smallholder areas undermines the development of a cereal-based fertilizer market. Governments should invest in roads, telecommunications, and other physical infrastructure that will reduce costs to trading companies and farmers.**

**(2) Order needs to be put into the "rules of the game" in the emerging fertilizer market to protect and benefit the weakest players, the smallholders**



and the small-medium trading companies. Regulation of the market through testing and registration of products will help to control quality in fertilizers in the new liberalized markets where many new products are entering.

**(3) Small farmers need a wide range of profitable and risk-reducing technology packages, and skills and information to participate in the emerging markets.** The piecemeal efforts of companies or NGOs provide inadequate coverage. Public action is needed in three areas: (a) breeding and agronomic research and extension that help develop site-specific fertilizer recommendations and help smallholders use fertilizer more efficiently (via complementary measures such as organic matter application and soil conservation investments, and via access to improved varieties); (b) research and extension (including soil testing services) to help smallholders judge which fertilizers are agronomically appropriate and profitable; and (c) market and product information systems to inform farmers of changing prices and types of fertilizer available on the market.

**(4) The emergence and development of small-medium trading companies need to be encouraged as it is critical to access fertilizer and credit for smallholders.** Three actions are important to that end: (a) public market information services can help inform these firms of changing prices, fertilizer import opportunities, keep abreast of manufacturers' new products, of regulations and registration, and of opportunities for business linkages with larger firms; (b) training will help these firms deal with the risk of the smallholder market; and (c) improvement of the judicial system for contract enforcement will reduce the risk they face.

**(5) Price and production risk can undermine an emerging fertilizer market.** And that risk is particularly important in smallholder, rainfed cereal production areas. A very expensive solution to climatic risk is widespread irrigation, which is prohibitively expensive in most countries. More promising is breeding for short-cycle cereal varieties that better handle drought and short growing seasons than do current varieties. More regional trade in maize will decrease price fluctuations and reduce market risk, and that trade can be encouraged by policies that promote market integration and free flow of goods. Encouraging small-scale processing of maize will develop market outlets and thus increased profitability for smallholder maize.

**POLICY ISSUES FOR FURTHER DEBATE AND RESEARCH:** The following are pressing unresolved issues in Zambia and Zimbabwe, and should also be on the agenda for debate in other countries pursuing cereal-based development of fertilizer demand.

**(1) What are the costs and benefits of alternative approaches to spurring private investment in fertilizer marketing?** This is a priority, especially with respect to the scaling-up of current pilot schemes by businesses, NGOs, and governments, and to selection of infrastructure investments.

**(2) What degree of dependence on NGOs is desirable?** Their services are not necessarily cheaper than public provision of fertilizer-related services. There has been little analysis of their cost effectiveness relative to alternatives.

**(3) What would be the implications of losing domestic fertilizer production capacity in Zimbabwe to foreign competition in an increasingly regional market? What actions, if any, should be taken to maintain it?** Given the need in the next two decades for much more fertilizer than domestic firms can produce, it will be hard to maintain protection and still meet fertilizer needs. How can investment and competition be spurred but also "level the playing field?"

**(4) What role should there be for relief in the form of fertilizer aid?** This can temporarily fill a void in market coverage, and help farmers in the short run. However, preliminary evidence suggests such aid is costly and can provide a disincentive to private fertilizer traders.

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