



POLICY SYNTHESIS

for Cooperating USAID Offices and Country Missions
(<http://www.aec.msu.edu/agecon/fs2/psynindx.htm>)



Number 76

September 2005

ALTERNATIVE APPROACHES FOR PROMOTING FERTILIZER USE IN AFRICA, WITH EMPHASIS ON THE ROLE OF SUBSIDIES*

By Eric W. Crawford, T. S. Jayne, and Valerie A. Kelly**

Food Security III Cooperative Agreement between U.S. Agency for International Development, Global Bureau, Economic Growth and Agricultural Development Center, Office of Agriculture and Food Security and Department of Agricultural Economics, Michigan State University

Policy Messages: Declining soil fertility in Sub-Saharan Africa threatens crop production, the major economic activity for many people. Improving the supply of fertilizer and expanding the opportunities for more productive fertilizer use will create broad-based gains in well-being.

- Most studies agree on the investments needed to establish appropriate “enabling conditions” to stimulate fertilizer demand and supply, and on giving priority to these investments over short-run fertilizer promotion programs and subsidies, whose value is vigorously debated
- Among the six categories of fertilizer promotion programs identified by the study, most include direct or indirect subsidies, and none have lived up to expectations fully.
- For economic or social reasons, fertilizer subsidies are usually intended to benefit small farmers, but much of the subsidy is often captured by others. Subsidies may also undercut commercial sales and discourage expansion by private traders, they are hard to sustain budgetarily, and they have less real development impact per dollar than other public investments.
- Because policy makers must address political and social goals, the desirability of alternative fertilizer investments should be evaluated using a broad perspective that considers these goals in addition to financial, economic, and environmental objectives.
- Policy and program choices must be based on systematic, empirical evaluation of the private and social costs and benefits at both the local and national levels.

BACKGROUND AND OBJECTIVES:

The advent of the new millennium found African policy makers facing a barrage of reports suggesting that soil quality decline was approaching crisis dimensions. It is generally agreed that the improvements in soil fertility needed to stimulate agricultural productivity and rural income growth and improve food security will require substantial increases in fertilizer use (both organic and inorganic) together with improved land husbandry practices. Despite increases in some countries, the average intensity of fertilizer use in Sub-Saharan Africa (SSA) remains much lower than elsewhere (roughly 9 kilograms per

hectare versus 86 kg/ha in Latin America, 104 kg/ha in South Asia, and 142 kg/ha in Southeast Asia). A key question is how government policies and programs should be designed to achieve the substantial increases in fertilizer use that are needed.

This paper outlines the role of improved soil fertility in the process of structural transformation, and examines specific financial, economic, social, and political arguments in favor of promoting increased fertilizer use, particularly in smallholder farming systems. The paper draws experiences and insights from the literature on which policies and programs appear to

work best and which least well in stimulating a sustainable increase in fertilizer use by small farmers. Special attention is given to addressing the question of fertilizer subsidies: Under what circumstances are they warranted and what form should they take, if and when they are implemented?

Using a benefit/cost framework for fertilizer policy analysis. The fertilizer policy problem is to choose the most cost-effective set of investments for achieving an agreed upon set of objectives, given available public funds. While most would accept this general statement, controversy arises in defining the objectives and in quantifying the potential for different investments or policy changes to attain these objectives. Input promotion programs typically have multiple objectives that reflect financial, economic, environmental, social, or political goals.

A broad analytical perspective should be used in assessing the requirements and the impacts of alternative interventions. This implies taking into account dynamic and partial equilibrium effects, and addressing social, political, agronomic, and environmental as well as economic dimensions of the issue. Impacts should be valued using economic prices (reflecting opportunity costs), not just financial prices (which may be affected by taxes or subsidies). This distinction is familiar to many, but is not always clearly maintained in discussions of input programs. Assumptions about the “counterfactual” (what would have happened without the input program) must be made explicit since that determines the baseline against which the incremental impact is measured.

Typology of fertilizer promotion programs. Fertilizer promotion has been pursued through programs that directly stimulate fertilizer use or that improve the enabling conditions for fertilizer use (e.g., policy and institutional reforms that improve market performance). Six categories

of fertilizer promotion programs have been popular in SSA:

1. **Controlled state input distribution programs.** Through an integrated system of input and output markets, the state distributes fertilizer and other inputs to farmers (often on credit) and attempts to recoup the input costs at harvest time.
2. **Targeted government input distribution programs in an open market.** Public sector fertilizer distribution plays a more limited and financially sustainable role, by targeting input subsidies to selected farmers while allowing private sector input distribution on commercial terms.
3. **Sasakawa/Global 2000 programs.** SG-2000 programs in the 1990s supported half-hectare demonstration plots, often in productive areas, where farmers were supplied with credit, improved inputs, and extension advice.
4. **Outgrower or cooperative programs with interlinked input-credit-output market transactions.** An outgrower company or cooperative (e.g., for coffee, cotton, or sugar) links seasonal finance, input delivery and output marketing, similar to (1) above.
5. **Public sector facilitation of private sector fertilizer supply.** Public investments, e.g., in market and transport infrastructure, are made to support expanded private sector involvement in fertilizer marketing to small farmers.
6. **Starter pack programs (Malawi).** With food security and safety net objectives, this program initially provided almost every small farm household with a free “pack” of fertilizer and improved maize and legume seed sufficient for cultivation of 0.1 hectares.

SUBSIDIES: Fertilizer subsidies can differ in terms of (1) the point at which the subsidy is applied (farmer, trader, domestic fertilizer producer); (2) the form of the subsidy, or how it is provided (cash

payment, voucher/coupon, reduced market price, transport subsidy); and (3) related to the above, whether the subsidy is direct (fertilizer price reduced), or indirect (through subsidized credit, for example).

Arguments in favor of fertilizer subsidies fall into three categories:

- *Financial.* Increased agricultural output or incomes (for farmers and traders) are valued using prevailing (i.e., financial) prices, without necessarily making an explicit case that the efficiency losses from the subsidy are offset by the output/income gains.
- *Economic.* Subsidies are expected to create real economic gains by (a) “kick-starting” a process of innovation, e.g., through credit to overcome liquidity constraints, so that agricultural productivity rises in the medium to long term or (b) correcting for missing or imperfect input and output markets.
- *Non-economic.* Subsidies are expected to help restore soil fertility, improve food security, alleviate poverty, and provide social and environmental protection—all objectives whose economic impacts are difficult to quantify.

Arguments against fertilizer subsidies most often stress the following problems:

- Misallocation of scarce resources: stimulation of fertilizer use where it is not economically profitable, and/or diversion of scarce public resources from other productivity-enhancing investments that promise higher or longer-lasting payoffs.
- Ineffective targeting: the beneficiaries are supposed to be poor farmers but some fertilizer leaks out to others and elites may capture much of the benefit.
- Market disruptions: unpredictable changes in subsidy programs, which discourage private sector investment; price control and rationing, which encourage rent-seeking behavior; political interference; and unfair competition between state-run and private sec-

tor enterprises. Such effects can undermine the development of commercial fertilizer marketing networks to serve small farmers.

Alternatives to subsidies. A large number of policies and investments have been suggested as alternatives to subsidies in order to reduce the cost of fertilizer and to improve its effect on yields:

- Improving enabling conditions by promoting policies and institutions that contribute to efficient markets for inputs, financial services, and outputs.
- Reducing the high costs of transportation, e.g., costs of handling and port clearance and poor road quality.
- Reducing taxation on agriculture.
- Investing in agricultural research, extension, and rural education.

CONCLUSIONS: The literature on agricultural development and soil fertility reflects a variety of perspectives or objectives, depending on the training, experience, and occupational position of each author. The literature shows reasonable agreement on strategic measures to establish appropriate enabling conditions. It is argued that rapid growth in fertilizer use will require (a) increased investment in transportation and marketing infrastructure to stimulate private sector growth, drive down the costs of fertilizer and improve farmer output prices so that fertilizer use becomes more profitable for farmers; (b) the generation and diffusion of improved seeds that are more responsive to fertilizer application; (c) better extension services and extension messages that can improve small farmers’ ability to use fertilizer profitably; (d) cost-effective means of reducing the risks of using fertilizer and producing for the market; (e) greater attention to institutional development (improved legal systems and contract enforcement, grades and standards, market information) and capacity-building (farmer training, development of farmer organizations); and (f) facilitation of rural financial

markets to promote smallholders' ability to finance fertilizer purchases.

There is much less agreement on short-run fertilizer promotion programs in general, and fertilizer subsidies in particular. It is not easy to find a type of program that dominates others when multiple objectives are pursued. These issues are illustrated in the discussion of programs that involve distribution of fertilizer and complementary inputs such as improved seed, where productivity gains can be achieved if the program focuses only on larger and more capitalized farmers, or where poor farmers can be reached through mass distribution but at the cost of lower productivity and inefficient targeting.

While free or heavily subsidized input distribution programs in Africa are often motivated by the desire to address urgent problems of poverty or food security, the cure can be worse than the disease. Most such programs have proven to be costly, difficult to sustain, ineffective at targeting relatively poor farmers, subject to rent-seeking, and harmful to development of sustainable input delivery systems. Small-scale programs may avoid these problems, yet still not succeed in raising aggregate fertilizer use enough to have a significant impact on output or poverty alleviation.

Subsidies may be warranted when there is a clear prospect of significant productivity gains (addressing economic growth objectives), when subsidies are a less costly form of income transfer than alternatives such as food aid (addressing poverty alleviation objectives), and/or when they can be designed in a way that promotes sustainable private sector involvement, or at least that avoids negative impacts on private markets. The challenge remains to determine whether these conditions are likely to be met in a given situation, and what the costs and returns are relative to alternatives. Policy and program choices should be based at

least in part on local-level empirical analysis of likely impacts and their resulting costs and benefits. It is not enough to know the tradeoffs, i.e., types of benefits and costs, associated with alternatives. To decide among them also requires some estimate of the cost and benefit magnitudes. We need to move beyond storytelling to more systematic evaluations of the private and social costs and benefits of different fertilizer promotion efforts.

When undertaking these analyses, it is important to remember that increased fertilizer use should not be considered a goal in isolation. The broader goal is to ensure adequate soil fertility in order to support increased agricultural productivity, food security, and incomes. Inorganic fertilizer is one of many inputs needed to accomplish these broader goals, hence the systematic evaluations of private and social costs mentioned above must also include analyses of technologies and practices that complement and/or substitute for inorganic fertilizers.

*This *Policy Synthesis* is a condensed version of a longer, similarly named paper that is forthcoming as a World Bank Agriculture and Rural Development Discussion Paper and downloadable from http://www.aec.msu.edu/agecon/fs2/inputs/documents/fertilizer_crawford_wb.pdf

**The authors are, respectively, Professor; Professor, International Development; and Associate Professor, International Development, Department of Agricultural Economics, Michigan State University, East Lansing MI 48824-1039, USA.

The authors acknowledge funding to prepare the full paper provided by DFID through the World Bank, research support by Andrew Kizito, Megan McGlinchy, and Jones Govereh, and comments from Duncan Boughton and FAO and World Bank reviewers. Funding to prepare this *Policy Synthesis* was provided by the Food Security III Cooperative Agreement (GDG-A-00-000021-00) between Michigan State University and the United States Agency for International Development, through the Bureau for Economic Growth, Agriculture and Trade's Office of Agriculture and Food Security with supplemental funding from the Africa Bureau's Office of Sustainable Development.