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# FERTILIZER SUBSIDIES IN AFRICA

## Are Vouchers the Answer?

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**In the 1970s and 1980s, most African countries sold fertilizer at subsidized prices through state-owned enterprises. In response to the fiscal cost and ineffective implementation of these subsidies, as well as pressure from international financial institutions, almost all of these countries liberalized their fertilizer markets to some degree as part of structural adjustment programs carried out in the late 1980s and early 1990s. Under these reforms, governments eliminated state monopolies on fertilizer distribution and phased out universal subsidies.<sup>1</sup>**

Now several factors have stimulated renewed interest in fertilizer subsidies in Africa. The fertilizer and seed subsidy program of the government of Malawi is credited with contributing to significant increases in that country's maize harvest. African policymakers came together in 2006 at the African Fertilizer Summit and resolved that member states should grant "targeted subsidies in favor of the fertilizer sector."<sup>2</sup> Both the Millennium Villages program, guided by economist Jeffrey Sachs, and the Alliance for a Green Revolution in Africa have in recent years called for governments to boost fertilizer use in Africa, with subsidies if necessary.<sup>3</sup> Finally, the global food crisis of 2007–08 highlighted the importance of boosting agricultural production. Increased fertilizer uptake is an important component in raising crop yields on the continent—on average, farmers in Sub-Saharan Africa use about 13 kilograms (kg) of fertilizer nutrients per hectare (ha) of arable land compared with the developing-country average of 94 kg/ha.<sup>4</sup>

Yet fertilizer subsidies remain controversial. Many development economists and international development agencies point to the high cost and limited effectiveness of fertilizer subsidies in the 1970s and 1980s. They note that past subsidy programs, which often involved state monopolies in fertilizer marketing, undermined the emergence of efficient, widespread, private input distribution networks. Moreover, there are significant opportunity costs to devoting public funds to subsidizing fertilizer rather than investing in market development, agricultural research, transportation infrastructure, or other public goods to achieve a country's development goals.<sup>5</sup>

Proponents of subsidies believe, however, that fertilizer subsidies are the only way to jump-start African agriculture and deliver concrete food security and income benefits to the rural poor. Agronomists see

such subsidies as a way of reversing the depletion of soil nutrients in Sub-Saharan Africa. Political leaders often view fertilizer subsidies as a simple way to quickly assist rural households. And some development agencies see them as central to achieving a Green Revolution in Africa.

These proponents argue that governments can avoid the mistakes of the past by implementing "smart subsidies," which are designed to target the poor and to support, rather than undercut, the development of private input distribution markets. Input vouchers have been proposed as a way to make fertilizer subsidies "smart." Nonetheless, such schemes are not appropriate or cost-effective in all situations. It is important to clarify the conditions under which fertilizer subsidies and vouchers make sense.

## TRADITIONAL FERTILIZER SUBSIDIES

Many African smallholder farmers seem to use much less fertilizer than is economically optimal.<sup>6</sup> They may use too little fertilizer because they lack information on how to use fertilizer effectively and profitably, because they are risk averse in the face of uncertain rainfall, or because they lack the cash to pay for it because of low income and poorly functioning credit markets. In areas with sparse or sporadic demand, retailers will not find it worthwhile to stock fertilizer, resulting in a collapse of the local fertilizer supply. If subsidies help farmers offset these constraints and reach optimal application rates such that the additional farm income exceeds the cost of the subsidy program, they can be justified on efficiency grounds. Alternatively, if fertilizer subsidies are a cost-effective way of assisting the rural poor, they can be justified on equity grounds.



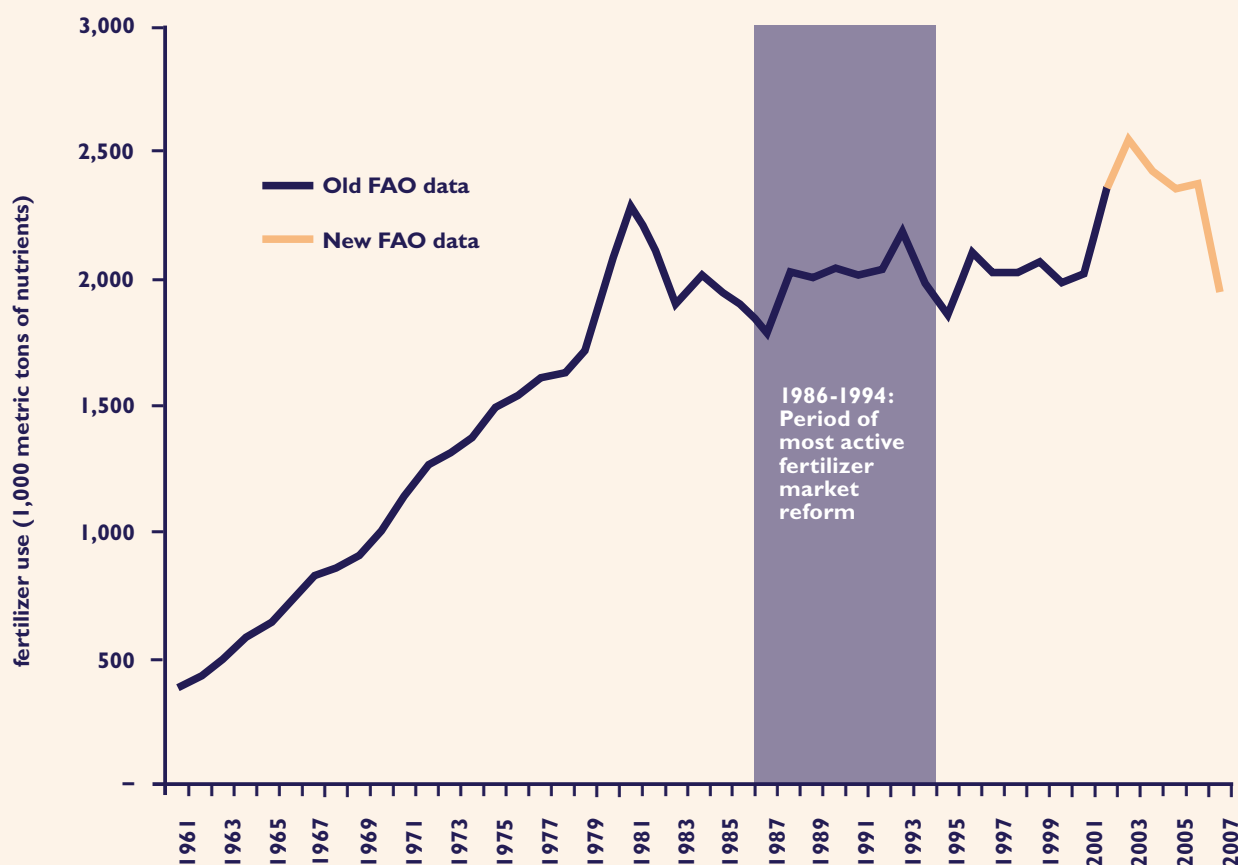
Based on these arguments, as well as general suspicion of markets, most African governments tightly controlled their fertilizer markets in the 1970s and 1980s. Typically, one or more state-owned entities had a legal monopoly on importing and distributing fertilizer. Fertilizer prices were subsidized at below-market levels and fixed at one rate throughout the country. The fertilizer was often distributed as part of government-run agricultural credit schemes, and a large percentage of the fertilizer was provided by donor agencies as in-kind aid.<sup>7</sup>

These policies, however, resulted in high financial costs and inefficient distribution. Fertilizer was often delivered to farmers late and in limited quantities. Although fertilizer subsidies were politically popular, economists and policymakers began to believe that the fiscal cost was not worth the benefits to farmers. In addition, growing evidence showed that the bulk of the benefits of these subsidies went to larger and richer farmers, thus

undercutting the equity argument for subsidies.<sup>8</sup> Under the structural adjustment programs of the International Monetary Fund (IMF) and the World Bank, most African countries phased out fertilizer subsidies and opened up fertilizer markets to competition from the private sector as part of wider market reforms in the economy.

The link between fertilizer policy and fertilizer use in Africa is not very direct. According to the Food and Agriculture Organization of the United Nations (FAO), annual growth in fertilizer use in Sub-Saharan Africa was 9 percent over the 1960s and 1970s, but since 1981 fertilizer use has stagnated at around 1.9–2.2 million metric tons, with some possible signs of growth since 2000 (see Figure 1). Given that few countries had begun to liberalize their fertilizer markets by 1981, it is difficult to attribute this stagnation to the reforms. In some countries, subsidy removal and devaluation resulted in sharp reductions in fertilizer use (Cameroon, Ghana,

**Figure 1—Fertilizer use in Sub-Saharan Africa, 1961–2007**



Source: FAO (Food and Agriculture Organization of the United Nations). 2009. FAOStat. <http://faostat.fao.org/site/422/default.aspx#ancor>. Accessed July 15, 2009.

Note: Data refer to the 33 countries for which data exist in both old and new FAO fertilizer data series. These countries represent 98 percent of fertilizer use in Sub-Saharan Africa.

Nigeria, Senegal, and Tanzania), whereas in other countries fertilizer use actually increased (Benin, Madagascar, Mali, and Togo). This finding implies that fertilizer policy is only one factor affecting fertilizer prices and that fertilizer prices are one of several determinants of fertilizer use.<sup>9</sup>

## FERTILIZER MARKET DEVELOPMENT PROGRAMS

Fertilizer market development is an alternative approach to improving farmers' access to fertilizer that has become more common over the past 10–15 years. This strategy involves improving the policy environment, strengthening and expanding the network of private agro-input dealers with training and credit, and providing farmers with information about fertilizer use through advisory services and demonstration plots.

A key policy issue, therefore, is whether direct subsidies on fertilizer to small farmers are as effective in building sustained improved access to fertilizer as, for example, support to intermediate actors in the fertilizer supply chain or better information for farmers on how to make productive use of fertilizer. The answer seems to be, it depends. If farmers have reasonable access to cash or credit, then it is more effective to support the fertilizer supply chain than farmers directly. Evidence of this finding comes from Kenya, which has relatively effective smallholder credit provision and higher household cash incomes than do many other countries in Sub-Saharan Africa. A stable fertilizer policy environment in Kenya supported increasing investment in fertilizer marketing at all levels from importers to retailers. The number of rural stockists of fertilizer increased sharply, and the increasingly competitive fertilizer sector worked to reduce its transaction costs, giving farmers more incentives to use fertilizer. Moreover, fertilizer dealers tailored their products to farmers' needs. For example, they offered small, experimental packets of improved seed and fertilizer for farmers with only a little cash. A sustainable fertilizer supply system within the private sector is emerging with minimal direct delivery of subsidies to farmers.<sup>10</sup>

Even with the success achieved in Kenya, however, the economics of profitable fertilizer use still apply—fertilizer use remains limited in remote agricultural areas of the country where high transport costs render farmgate crop prices too low and costs of fertilizer are too high to allow its profitable use. The economically optimal fertilizer

application rate in such areas is zero. As in many other remote areas of Sub-Saharan Africa, other investments than fertilizer subsidies, such as agricultural technologies appropriate for local economic conditions or improved roads and communication services to foster market development, would make greater contributions to the welfare of farm households in such areas.

## SMART SUBSIDIES AND INPUT VOUCHERS

Could past problems with fertilizer subsidies stem from how the fertilizer was provided to farmers? Some suggest that new ways of designing subsidy programs may help avoid past mistakes. Smart subsidies are mechanisms to provide subsidized goods and services designed both to promote market development and to enhance the welfare of the poor. Below-market-cost provision of goods and services, generally by private-sector suppliers, from which the poor in particular are likely to benefit, can be considered smart subsidies. For example, provision of foot-driven irrigation pumps or small seed and fertilizer packages and the creation of local schemes to exchange breeding animals among farmers with small herds could all qualify as smart subsidy interventions. The subsidies can be phased out once the market infrastructure has been developed and markets are functioning.

A common approach to designing smart subsidies for fertilizer use involves input vouchers. The idea is simple. Farmers are given vouchers that they can take to local, often small-scale, private input suppliers to acquire fertilizer (or seed or pesticides). The cost of the fertilizer for the farmer is reduced by the value of the voucher. The supplier, having provided fertilizer to the farmer in exchange for the voucher and any additional cash cost beyond the value of the voucher, takes the voucher to a bank or other designated agency and is reimbursed for its value, plus a handling fee. The voucher is an income transfer to the farmer from the government, donor, or implementing agency, but it is a transfer that can be realized only through private-sector suppliers. For input suppliers, the vouchers are a way to guarantee demand (and a profit margin) for the fertilizer that they supply, potentially enabling them to capture economies of scale in their business, reducing some of their risk, and contributing to setting their business on a sound financial footing.<sup>11</sup>

In theory, input vouchers have a number of advantages

over direct government in-kind provision of subsidized fertilizer to farmers, interventions affecting the entire national fertilizer market, or other forms of subsidies on fertilizer:

- Vouchers can help build the private-sector distribution network by requiring that farmers take their vouchers to private input dealers to exchange for fertilizer.
- Voucher programs can build exit strategies by reducing the value of the voucher over time or converting it to a crop production credit that is repaid at harvest.
- Voucher programs provide an opportunity to train farmers and input suppliers on efficient, profitable use of fertilizer.
- In emergency response situations, vouchers can replace food aid as medium-term support to those affected.

Input vouchers also have disadvantages, however, depending on how they are implemented:

- Administrative costs can be high, particularly if the government attempts to target certain types of households, such as small farmers.
- Vouchers may leak out of the target group if the intended beneficiaries resell the vouchers to others. Although the targeted group benefits from the cash income, leakage defeats the goal of boosting their agricultural productivity.
- The use of vouchers to acquire fertilizer may displace some purchases of fertilizer that the voucher recipient would have made with his or her own resources, thereby undercutting efforts to develop a sustainable private-sector input supply system.
- Fertilizer vouchers are of value only to farmers that grow crops that are responsive to fertilizer and that live close enough to an input supplier to make the transaction worthwhile.
- For voucher programs to promote input market development, the vouchers need to be redeemable at private input dealers. Voucher programs that involve only government suppliers of fertilizer or only selected private dealers weaken the private distribution network.
- Finally, to promote input market development, the

voucher programs need to be in place for 5 to 10 years. One-time voucher programs are likely to retard rather than enhance market development and result in less efficient use of fertilizer by farmers. Longer-term programs, however, do not match government and donor funding cycles, so they are often difficult to sustain.

## INPUT VOUCHERS IN PRACTICE

Malawi's voucher program is the largest and the one most often cited as a smart subsidy success story. Malawi eliminated universal fertilizer subsidies for smallholders in the mid-1990s, but it reintroduced limited subsidies in 1998 through the Starter Pack program, which gave all farmers, free of charge, 10–15 kg of fertilizer and enough improved seed to plant 0.1 ha. After two years, this program was converted into the Targeted Input Program (TIP), which distributed the packs to a targeted group of farmers, with the percentage of all farming households in Malawi targeted varying between 33 and 96 percent, depending on the year.<sup>12</sup>

In 2005, the program was redesigned as the Agricultural Inputs Subsidy Program (AISP), a voucher-based universal subsidy program that allows farmers to buy 100 kg of fertilizer at about one-fifth of the market price, thus dramatically increasing both the quantity of fertilizer being subsidized and the fiscal cost of the subsidy. The combination of increased fertilizer use and good rainfall has resulted in substantially increased maize production over the past few years, leading to improved food security and even some maize exports.

Vouchers have been used in Malawi fertilizer programs since the TIP in 2000, but the distribution of the subsidized inputs has been managed largely by two state-owned enterprises. Private importers are contracted to deliver the subsidized fertilizer to distribution points, but private agro-input dealers have generally not been involved in distribution. Under the TIP program, these dealers still maintained a large market share because the subsidized fertilizer accounted for just 9–24 percent of the total fertilizer market in Malawi. With the AISP, however, the proportion of subsidized fertilizer has increased to about half and the market share of private input distributors has fallen to 58 percent. Although the government experimented with allowing fertilizer vouchers to be redeemed at private distributors, this effort has been

discontinued because of allegations of misuse of the vouchers. The theoretical virtues of input vouchers as a smart subsidy to strengthen private input supply networks are thus negated by the way the AISP is implemented.<sup>13</sup>

In 2006–07, the total cost of the AISP was US\$91 million, representing 45 percent of the budget of the Ministry of Agriculture and Food Security and 5.2 percent of the national budget. An evaluation of the AISP estimated that the benefits in terms of additional maize production were between 76 and 136 percent of the costs, leaving it ambiguous whether the program can be justified on efficiency grounds.<sup>14</sup> Since then, the cost of the program has expanded to more than US\$200 million, largely because of the rise in international fertilizer prices.<sup>15</sup>

The AISP is widely seen as a success among African policymakers. Based on Malawi's success in stimulating maize output, a number of countries, including Ghana, Kenya, and Tanzania, have launched voucher-based fertilizer subsidies, and others, like Zambia, are considering such programs. In Tanzania, the government used to subsidize the transportation of fertilizer to remote regions of the country. Starting in 2008, it redesigned the program as a voucher-based subsidy, in which farmers receive vouchers for 100 kg of fertilizer, other agrochemicals, seed, and seedlings, redeemable at any private agro-input dealer. With support from the World Bank, this program is being scaled up to reach 1.5 million beneficiaries.<sup>16</sup> Kenya launched a similar program in 2006, though on a smaller scale. Ghana initiated a voucher-based fertilizer subsidy in 2008 in response to the sharp rise in fertilizer prices. Distributors affiliated with the fertilizer importers were allowed to participate, but independent dealers were excluded from participation.<sup>17</sup>

Based on the limited experience to date, voucher-based fertilizer subsidy systems are not immune to some of the problems that plagued the universal fertilizer subsidy programs in the 1970s and 1980s. One example is late delivery of fertilizer. In 2004–05, Malawian farmers held off buying fertilizer in expectation of a large subsidy, but delays in the decisionmaking and budgeting process meant that the subsidized fertilizer arrived too late for many farmers. Ghana had a similar experience in 2008.

Another example is the displacement of private-sector dealers, which has occurred in Ghana and Malawi to varying degrees.<sup>18</sup> In this respect, the Tanzania voucher program appears to be more successful in promoting the development of a private distribution network. It remains to be seen if these implementation problems can be corrected as the programs mature or if they are inherent

problems associated with public-sector involvement in fertilizer distribution.

## ISSUES IN IMPLEMENTING INPUT VOUCHERS

Input vouchers may well be the best instrument to attain the objectives of a particular public program for agriculture and rural development, but this result cannot be assumed. The specific design and quality of implementation are critical to success. It is important to address three broad issues when considering fertilizer input vouchers:

- 1. The objectives of the intervention.** Input voucher programs are typically saddled with several objectives. The most prominent are developing the private input supply system, reducing poverty, and attaining national or household food security, but others may include accelerating technology transfer and helping provide a social safety net for the poorest members of rural communities. It is not realistic to expect, however, that a single program can succeed in achieving multiple objectives in a sustainable way. Prioritized objectives are needed for any input voucher program.
- 2. The effectiveness of targeting and the potential for leakage.** Ensuring that the benefits of an input voucher program go to the designated beneficiaries is a challenge. An evaluation of the TIP in Malawi, which relied on community-based targeting using poverty criteria, found that the beneficiaries were no poorer on average than non-beneficiaries. Lack of information, political interference, and implementation constraints, such as insufficient time in the face of coming rains or poor voucher control systems, all reduce the efficiency of targeting of the vouchers.

Although various program designs offer partial solutions to the problem of targeting, a more fundamental question is whether targeting matters. The answer depends on the objectives of the program. If the principal aim of the program is to develop the input supply system, then it may not matter whether the person who redeems the vouchers is a targeted farmer or not. In contrast, if poverty reduction or household food security is the focus, then it is

important to target the poor or food insecure. Yet, from a poverty reduction standpoint, the formation of a secondary market in vouchers does not necessarily indicate a flawed program, so long as the vouchers initially were provided to poor farmers.

### 3. The appropriateness of focusing on fertilizer.

If the objective of an intervention is to strengthen private input supply systems, fertilizer vouchers that can be redeemed at private input suppliers make sense. They provide incentives to farmers to use fertilizer and create effective demand to which suppliers will respond. When vouchers are used to reduce poverty or strengthen social safety nets, however, the rationale for providing vouchers rather than cash transfers or public goods and services is less clear. There are significant opportunity costs in devoting resources to the supply of fertilizer, a private good, at the expense of public goods that may have higher returns in terms of growth and poverty reduction.

## ARE VOUCHERS THE ANSWER?

Historically, African smallholder farmers managed the fertility of their croplands mainly by leaving fields in fallow regularly and, in some regions, by applying animal manure. In many important agricultural areas, however, increasing rural population densities are reducing the land available for crops and pasture, posing challenges for both of these approaches to soil fertility management. As such, significantly greater use of inorganic fertilizer will be an increasingly important factor to ensure that farmers in Africa are able to farm profitably and to boost production to meet the food needs of the continent. Enabling farmers to expand their use of inorganic fertilizer is a key challenge facing African governments. The evidence is fairly clear that the fertilizer subsidies governments implemented in the 1970s and 1980s had a high fiscal cost, largely displaced private-sector input distribution systems, and were not very effective in stimulating output or assisting the poor.<sup>19</sup> The current debate revolves around the question of whether better-designed fertilizer subsidy schemes could achieve some of the objectives of the older programs—namely, increased productivity and reduced rural poverty—without their attendant high costs and adverse side effects.

Fertilizer subsidies are most likely to be a good option when farmers are not familiar with the benefits of fertilizer, when there is demonstrated profitability and low adoption, when the subsidies can be targeted to the poor, and when the input distribution network is dense enough to allow an input voucher system to work.

Targeting fertilizer subsidies can reduce the cost and make the subsidy more pro-poor, but the experience with administrative targeting of poor households has not been encouraging.<sup>20</sup> One effective way to target poor households is to offer free or subsidized inputs of a limited quantity, where the quantity is small enough to interest small farmers but not larger farmers. Another approach to targeting is to provide fertilizer in exchange for providing labor to public works, which will interest poor households more than their better-off neighbors. Both of these approaches can be implemented with input vouchers.

There appears to be agreement that, where fertilizer subsidies are implemented, input vouchers are preferable to direct state distribution of fertilizer. The use of input vouchers promises to stimulate the development of a private-sector input supply chain. The experience of Malawi demonstrates, however, that voucher-based subsidies do not necessarily promote the development of private distributors. Experience to date with vouchers is too thin to consider them a “proven” success. Rigorous impact evaluations of input voucher schemes are needed to determine whether the value of additional crop production resulting from the subsidy exceeds the full cost of the program. Of course, the ultimate objective is improving welfare and nutrition, but if an input subsidy cannot generate additional crop output whose value exceeds the program costs, then investments in agricultural research or food and nutrition programs are likely to have a greater impact on welfare and nutrition.

For development objectives that go beyond strengthening input markets and enhancing farmers’ ability to use inputs effectively, the value of input vouchers is less clear. In particular, vouchers appear to be a poor choice for attaining social safety net and poverty reduction objectives, even in rural farming communities, particularly if they are implemented in an inconsistent manner. There are significant opportunity costs in devoting significant public resources to the supply of fertilizer, a private good, at the expense of public goods such as infrastructure, education, or public health services that may have greater impact in reducing poverty.

Ultimately, the appropriateness of any intervention depends on the objectives being sought and the context.



Among the most effective options for reducing the farm-level cost of fertilizer or increasing the yield response are agronomic research on how crop yields respond to the application of fertilizer; economic research on fertilizer use and distribution costs; market development programs; and pilot programs with built-in impact assessment.

Finally, the evidence shows that a fertilizer subsidy program, even a well-designed one, cannot substitute for a broad-based program of public investment in agricultural research and extension and in infrastructure development, particularly roads, combined with a policy environment that facilitates private-sector development.

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