

9. Fertilizer subsidies

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Fertilizer promotion programs in Africa began in the 1970s. They were characterized by large, direct government expenditures using various entry points to ensure supply and to stimulate fertilizer demand and use. They included direct fertilizer subsidies, government input credit programs, and the centralized control of fertilizer procurement and distribution and of key output markets. The main aim was to increase productivity, but also to ensure smoother credit management. But these programs were expensive and fiscally unsustainable, governments lacked the capacity to implement them effectively, and the programs did not meet the diverse needs of many farmers. Most were dropped in the 1990s as part of the structural adjustment programs to reduce government indebtedness.

Subsidies came back into fashion following the 2006 Abuja Declaration on Fertilizers (Chapter 3). A dramatic rise in global food and fertilizer prices in 2007 and 2008 threatened food security in many countries, leading several to revive their subsidy programs (UNECA and AFFM 2018). Malawi was the pioneer, starting to distribute free fertilizers in 1998 (after having discontinued a similar program in the early 1990s). Nigeria followed suit in 1999, followed by Tanzania (2004), Kenya (2006), Burkina Faso, Ghana, Mali and Rwanda (2008), and Mozambique (2012). All of these subsidies were “targeted”, except in Kenya, which retains “universal” subsidies.

Governments were more equipped to bear the costs because of donors’ support and an open shift and support from the World Bank in favor of “smart” subsidies (Druilhe and Barreiro-Hurlé 2012, Jayne 2013).

Today most sub-Saharan African countries have some type of subsidy program in place. This usually goes along with import liberalization, allowing the private sector to import fertilizers as the government is not capable of covering the fertilizer need by the subsidy program over the whole country. The subsidies are usually included in the national agricultural investment program, which is part of the national development strategy. In 2016, the share of subsidy in total volume of fertilizer supply ranged from 12% in Zimbabwe, 28% in Malawi, 69% in Burundi, to 92% in Rwanda and 100% in Ethiopia (IFAP and IFDC 2017).

In order to support the subsidies program, countries such as Ghana, Mali and Tanzania have fertilizer policies, acts and regulations in place, while Burkina Faso, Malawi, Mozambique, Nigeria and Rwanda are on track to establishing a conducive policy environment. In some countries, the government retains a dominant role in managing the subsidy program; in others, the private sector plays a larger role. Mozambique and Uganda are yet to implement large-scale subsidy programs.



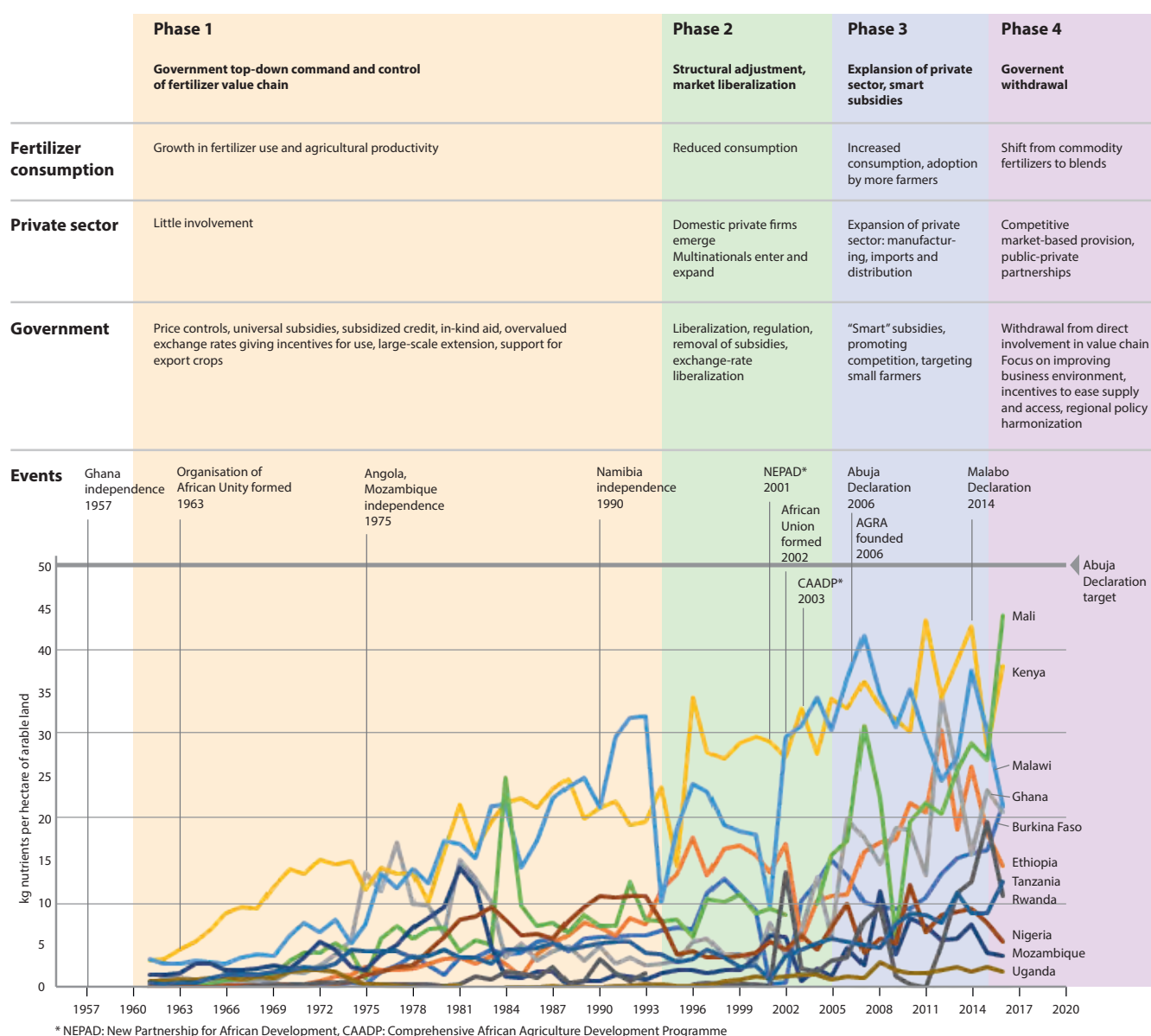


Figure 35. Phases in fertilizer policy since 1960, and fertilizer use per hectare in selected countries

Four phases

There are four relatively distinct phases in the evolution of fertilizer subsidies in Africa (Figure 35).

Phase 1: 1960-early 1990s

The first phase lasted from the early 1960s, when most sub-Saharan African countries gained independence, to the mid-1980s and early 1990s when governments started implementing structural adjustment programs. During this time, governments managed the fertilizer value chain with a top-down approach (Kherallah et al. 2002, Dorward and Chirwa

2014). They used a range of policies to do this (Kelly and Crawford 2007):

- Price controls on fertilizers
- Universal subsidies on the retail price of fertilizer
- Subsidized credit to farmers for fertilizer purchase with repayment through state marketing agencies
- Fertilizer aid-in-kind by donors
- Incentives for fertilizer use through overvalued exchange rates and foreign exchange allocation

- Large-scale demonstration and extension programs
- Company models for export crops such as cotton and tobacco.

These policies resulted in the growth in fertilizer use and agricultural productivity. However, they increased government budget deficits, and were fiscally unmanageable and unsustainable. Governments were forced to discontinue them during the structural adjustment programs of the late 1980s and early 1990s.

Phase 2: 1990s–mid-2000s

During the second phase, governments liberalized and privatized fertilizer industries under structural adjustment programs. Domestic private-sector firms emerged, and multinational fertilizer companies entered and began to expand their role in manufacturing, procurement, importing, trade, distribution, blending and selling of fertilizers. Governments increasingly played a regulatory role in the fertilizer value-chain. The removal of subsidies and the liberalization of the exchange rates raised fertilizer prices for farmers and reduced their consumption (Heisey and Mwangi 1996, Camara and Heinneman 2006).

Phase 3: mid-2000s–2015

In the third phase, the private sector expanded its participation under government regulation and “smart” subsidy programs (Jayne et al. 2015). This followed the Africa Fertilizer Summit in Abuja in 2006, during which African governments committed to liberalize the import and distribution of fertilizer and to introduce smart subsidy programs.

Countries pursued various policy approaches to expand private-sector participation in fertilizer production, importation and marketing. “Smart” subsidies were a major component of these. They include (Byerlee et al. 2007, Agreed International 2016):

- Promoting the development of private manufacturers, distributors and agrodealers
- Strengthening of markets
- Promoting competition and lowering costs by reducing or removing barriers to entry
- Targeting those smallholder farmers who do not currently use fertilizers but would find it profitable

These policies improved the environment for fertilizer agribusinesses and some farmers, resulting in higher

fertilizer consumption. The average fertilizer use in West Africa increased from 5–6 kg of nutrients per hectare in 2002 to about 9 kg in 2011 (Keyser et al. 2015). Farmers who had never before used fertilizer on food crops became aware of their benefits. Higher consumption ensured private importers and local blending companies to exploit economies of scale.

Phase 4: Since 2015

Since 2015, governments have begun withdrawing from fertilizer manufacturing, procurement, import, distribution and sale and from public-private partnerships (Jayne et al. 2018).

- **Burkina Faso.** In 2016 the government stated its intention to fully disengage from the fertilizer market and to devolve management to private-sector firms (Agreed International 2016).
- **Nigeria.** The government discontinued “smart” subsidies implemented from 2012 to 2015 under an electronic wallet voucher system under the Growth Enhancement Support Scheme and replaced this with the Presidential Fertilizer Initiative (Box 3).
- **Tanzania.** The government reformed its 7-year implementation of smart subsidies. It enacted regulations for bulk procurement starting in 2017 to drive down the costs of importing and transporting fertilizers and farm-gate prices (Agreed International 2016).
- **Kenya.** The government is still involved in fertilizer procurement. But the Ministry of Agriculture aims to redesign subsidies using flexible voucher and incentive-based models.
- **Malawi.** The private sector is increasingly taking over the procurement and sale of fertilizers to farmers. Firms are expanding their participation in procurement, import and distribution of fertilizer for the subsidy program.
- **Rwanda.** The government is implementing policies to put in place a private-sector-led fertilizer industry.
- **Ghana.** In 2016, the government began to implement an electronic platform to register farmers and improve the efficiency and transparency of subsidy programs.
- **Mozambique and Uganda.** Full-fledged government subsidy programs do not yet exist. The governments are giving firms incentives to expand investments

in procurement, import, manufacturing, blending, distribution, marketing and sale of fertilizer through e-voucher programs. Laws and administrative practices are slowing down the shift to a competitive market-based system and from commodity to balanced fertilizers. Quality problems are likely to increase if the market continues to grow without effective controls.

In the future, governments are likely to focus on providing information, strengthening the enforcement of regulations, improving legal institutions, and improving infrastructure. They will transition from being interventionists to being regulators (IFDC and AFAP 2018).

If governments continue to provide subsidies, they will need to reform them to encourage farmers to use appropriate balanced and blended fertilizers, and to target new areas where use is still low. Moving towards balanced fertilizers will require developing technical competence among actors in manufacturing, blending, and distribution. Policies also need to enable private-sector-driven dealer-certification programs and avail working capital finance for dealers and farmers and actors in the last mile of distribution and support private sector expansion. The logic of subsidies

The issue of fertilizer subsidies is a long-term issue in Africa, and there are no one-size-fits-all solutions. Higher crop yields do not necessarily translate to higher farmer incomes, especially where output markets are unstable and farmers are not linked to national or international markets.

The combination of low awareness of fertilizers (and skepticism about their utility) and high prices means that the demand for fertilizers is low in much of Africa (Figure 36 and Chapter 7). This leads to low productivity and low yields, which in turn causes household and national food insecurity. Low yields also inevitably mean low incomes for farmers, and the lack of money in farmers' pockets prevents the development of rural areas. At the same time, low productivity means more food imports and fewer crop exports, reducing the foreign-exchange balance.

In economics, this can be classified as market failure, a situation in which the allocation of goods and services by a free market is not efficient, often leading to a net social welfare loss.

Fertilizer subsidies aim to break this logjam. They reduce the fertilizer price for farmers, making them more attractive to try out, raising demand and producing higher crop yields. That leads to greater food security, higher farmer incomes and more

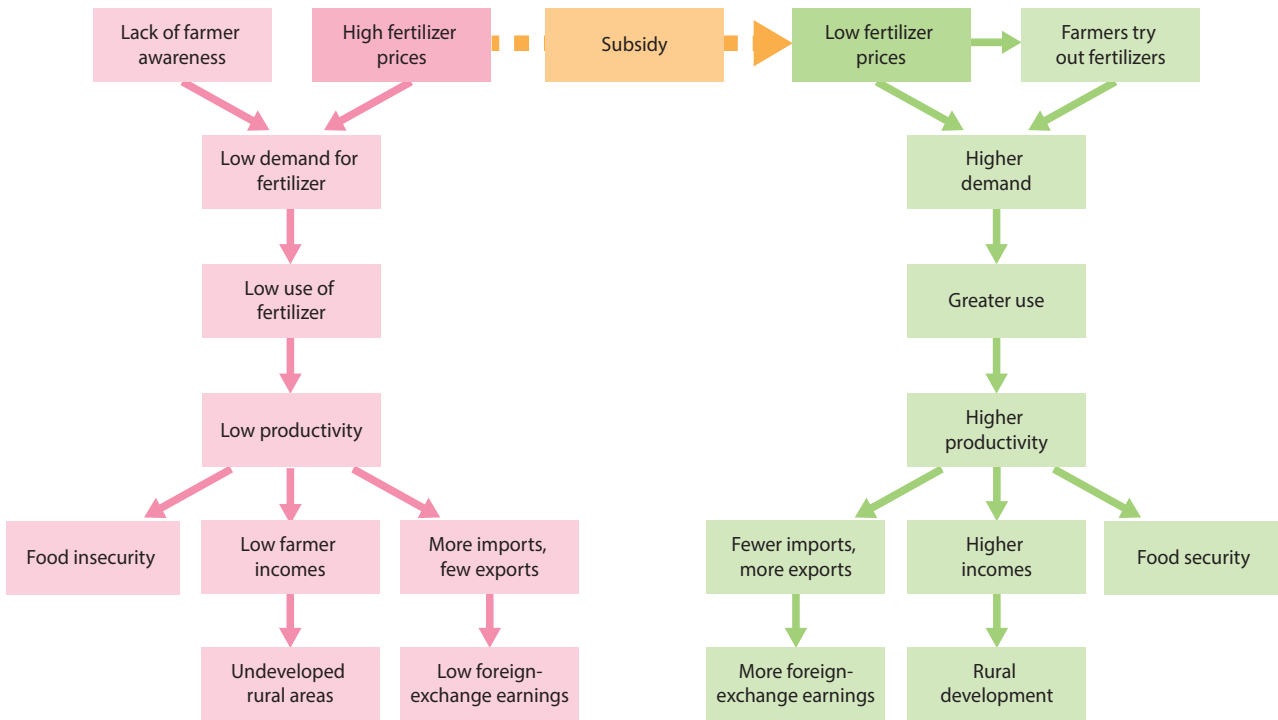


Figure 36. The logic of fertilizer subsidies

vibrant rural areas, and to lower food imports and more commodities that can be exported.

Subsidies are unlikely to achieve all these benefits on their own. Other factors include the availability of improved seed, appropriate agronomic and pest-management practices, improved transport, market and communications infrastructure, the availability of credit, better marketing possibilities, higher output prices, and farmer-training programs (Chapter 7). The subsidy program itself must be well-managed and targeted to the right farmers.

It is important to have clear policy goals for subsidy programs. For example, are they expected to generate lasting benefits, or merely to offset high fertilizer prices? Is the aim to improve food security, or to boost export earnings? Should the subsidies be targeted towards particular regions, crops or groups of farmers, or should they apply to all? How should the program be managed – by the government directly, or through the private sector? How can the subsidy system be structured so it encourages (rather than hinders) the development of the private-sector fertilizer distribution system? When and how should the subsidies be phased out? These things need to be clear from the onset. Such goals determine the structure of the subsidy program.

The main challenge often lies in the circumstances under which the subsidies are availed to farmers which is mostly in synchrony with political calendar. Fertilizer subsidies are popular with farmers, who make up a large proportion of voters in many countries. This makes them attractive policy options for governments – but hard to phase out.

However, some countries are struggling to sustain their subsidies (UNECA and AFFM 2018). In Ghana and a number of other countries, subsidy rates have been revised downwards. In Nigeria, the Growth Enhancement Support Scheme was discontinued in 2016 because it had accumulated a huge debt and had not achieved its objective of better targeting beneficiaries.

Types of subsidies

Subsidy programs are normally funded by the government, but may also be sponsored by donors, development banks or large development agencies. Development agencies such as the International Fertilizer Development Center (IFDC) design and manage subsidy programs on behalf of governments.

Subsidies fall into four main groups: universal, targeted, vouchers, and smart.

Universal or blanket subsidies

Universal subsidies do not make a distinction among farmers, crops or regions of a country. Such subsidies were common up to the 1980s and 1990s. While they are thought to have contributed to higher yields, much of the benefit accrued to influential or better-off farmers, and the cheap fertilizer displaced commercial sales, stunting the development of the private-sector fertilizer-distribution system (Druilhe and Barreiro-Hurlé 2012). This is found in Kenya, for instance.

Targeted subsidies

These subsidies are aimed at specific crops, types of farmers or regions of the country. The crops may be staples (where the aim is to boost food security) or cash crops (to boost exports). Growers of these crops get special access to the subsidized fertilizer, which may be specially formulated to the needs of the specific crop. The program sponsor (the government or a donor) may also target particular groups of farmers (such as poor smallholders) or a region (to increase productivity there or to introduce the fertilizer to farmers in the area.). This type of subsidies is found in Mali, Burkina Faso and Ghana.

Vouchers

One way to target particular farmers is to distribute vouchers to them. The farmer presents the voucher to an agrodealer, who cancels it and exchanges it for fertilizer at a reduced price. The agrodealer then

Table 13. Status of fertilizer subsidies and role of government and private sector in selected countries

Current situation	Major players	
	Government	Private sector
Fertilizer policies, acts and regulations in place	Kenya, Mali, Ghana, Burkina Faso	Ghana, Mali, Tanzania
Establishing conducive policy environment	Malawi, Nigeria	Rwanda
No large-scale fertilizer subsidy program	Mozambique, Uganda	

Source: AGRA (2016b)

redeems the voucher with the sponsor. This system makes it easier to target particular farmers, but it is open to fraud: paper vouchers can fall into the wrong hands, and despite safeguards such as watermarks and serial numbers, it is possible to forge them.

Smart subsidies

E-vouchers (often called “smart subsidies”) are an improvement on the paper sort. The farmers receive a voucher code on their mobile phones; they can then use this to purchase fertilizer from a private dealer. The dealer cashes in the voucher and is paid by the government, also electronically. Such arrangements are less exposed to abuse than paper-based systems. Since the global food crisis of 2007–8, various development organizations and the World Bank have helped governments to develop these programmes (Jayne et al. 2018). These types of subsidies can be found in Mozambique and Ethiopia (Box 9) (Wubeneh 2018).

In theory, smart vouchers turn farmers into clients: if they are not happy with one retailer, they can go to another one. The vouchers could also be designed to reveal potential demand: for example, farmers might use their vouchers to buy different types of fertilizer from those that have so far been on offer.

Criticisms of subsidies

Fertilizer subsidies remain controversial and are subject to number of criticisms. Here are the main ones:

Cost-effectiveness. Most evaluations of subsidy programs point out that they have increased fertilizer use, but at a high cost and with no assurance that farmers will continue to buy fertilizers after the subsidies are phased out (UNECA and AFFM 2018, Ariga 2017, AGRA 2014b).

Subsidy programs absorb a large proportion of national budgetary allocations to agriculture (AGRA 2014b). Over the last 18 years, ten African countries spent a total of roughly \$1 billion annually on subsidy programs, amounting to 28.6% of their public expenditures on agriculture (Jayne and Rashid 2013). Some countries (e.g., Malawi, Ghana and Zambia) spend 40–70% of their entire agricultural budgets on fertilizer subsidies, leaving little for research, extension or other important activities (UNECA and AFFM 2018).

Targeting. Most programs are of national scope and cover not only fertilizers, but also seeds and other inputs. The main targets are crop producers, particularly smallholders who produce food crops, but the targeting systems are generally inadequate or corrupted and do not ensure the inputs reach the intended beneficiaries.

Types of fertilizers. Governments often do not select the appropriate types of fertilizers to support. The products selected for subsidy are often compounds (e.g., NPK 15-15-15), lack appropriate micronutrients, and are not tailored to particular agroecological zones or crops. Some are not appropriate for the locations or crops they are applied on (USAID 2017), so have a sub-optimal impact on yields. Subsidized fertilizers are often also of questionable quality.

Improper use. Some farmers who obtain subsidized fertilizer do not know how to use it correctly: they apply it at the wrong time, in the wrong way, to the wrong crops. Services such as soil testing and extension advice are lacking in many areas.

Logistics. Most subsidy programs face logistical problems due to cumbersome government approval systems that delay the payment of import and delivery bills. This can lead to the late delivery of fertilizer (Keyser 2015). Late payments discourage private investors and dissuade some of the best providers from becoming involved (USAID 2017).

Diversion and corruption. Subsidy systems are open to abuse at various points: funds may be diverted, licenses may be misallocated, subsidies may go to people other than those intended, and the fertilizer may end up in the wrong hands or sold for more than the specified price. The private-sector providers are selected through a government-managed tender system, but this is often plagued with transparency and competition issues (USAID 2017). A lack of an authenticated farmer database makes programs prone to fraud: non-existent “ghost farmers” are allocated fertilizer, while genuine farmers are left empty-handed.

Roles of public and private sectors. The technical design of subsidies is dominated by the public sector, with little or no role for the private sector. The government is in charge of overall supervision and organizes and manages the targeting and distribution. Procurement and field delivery of subsidized fertilizers are carried out mostly by the private sector. Fertilizer subsidies usually divert customers away from private dealers, so discourage the development of private-sector markets (Wanzala-Mlobela et al. 2013).

Evaluation. Subsidy programs are not regularly evaluated, especially by external and independent entities. Accessible and reliable data are lacking.

Other factors. Cheaper fertilizer cannot, on its own, overcome all the problems in the agricultural production system. A range of other problems, including a lack of other inputs, lack of credit, inadequate extension services and limited output markets also constrain farmers’ production. An integrated approach is necessary to resolve these issues.

Box 9. Ethiopia's Input Voucher Scheme

Ethiopia's Input Voucher Scheme relies on six flows (Figure 37):

1. The Commercial Bank of Ethiopia offers financial institutions such as savings and credit cooperatives, microfinance institutions and commercial banks with local branches a loan so they can support purchases of fertilizer and other inputs, as well as capital for the voucher scheme. These loans are covered by a guarantee from the state government.
2. The financial institutions make loans to cooperative unions to buy inputs such as fertilizer, seed and agrochemicals from suppliers.
3. The suppliers provide these inputs to the unions, which supply them to primary cooperatives, which in turn supply farmers.
4. The financial institutions provide farmers with vouchers that they can use to purchase the inputs from the primary cooperatives. The primary coops redeem the vouchers with their cooperative unions, which in turn redeem them with the financial institutions.
5. At the end of the season, the farmers aggregate their produce and sell it to buyers.
6. Instead of paying the farmers directly, the buyers pay the financial institution, which deducts the loan (the value of the voucher) plus a fee, and pays the rest to the farmer.

In Amhara, one of Ethiopia's states, this scheme resulted in 2015 in the sale on a credit basis of over 66,000 tonnes of inputs worth ETB 570 million (about \$20 million) to 331,000 smallholders (57% of them women). The loan repayment the same year was an impressive 99.75%; in addition, 270,000 tonnes of other inputs worth ETB 3.6 billion were sold on a cash basis to 2.1 million smallholder farmers.

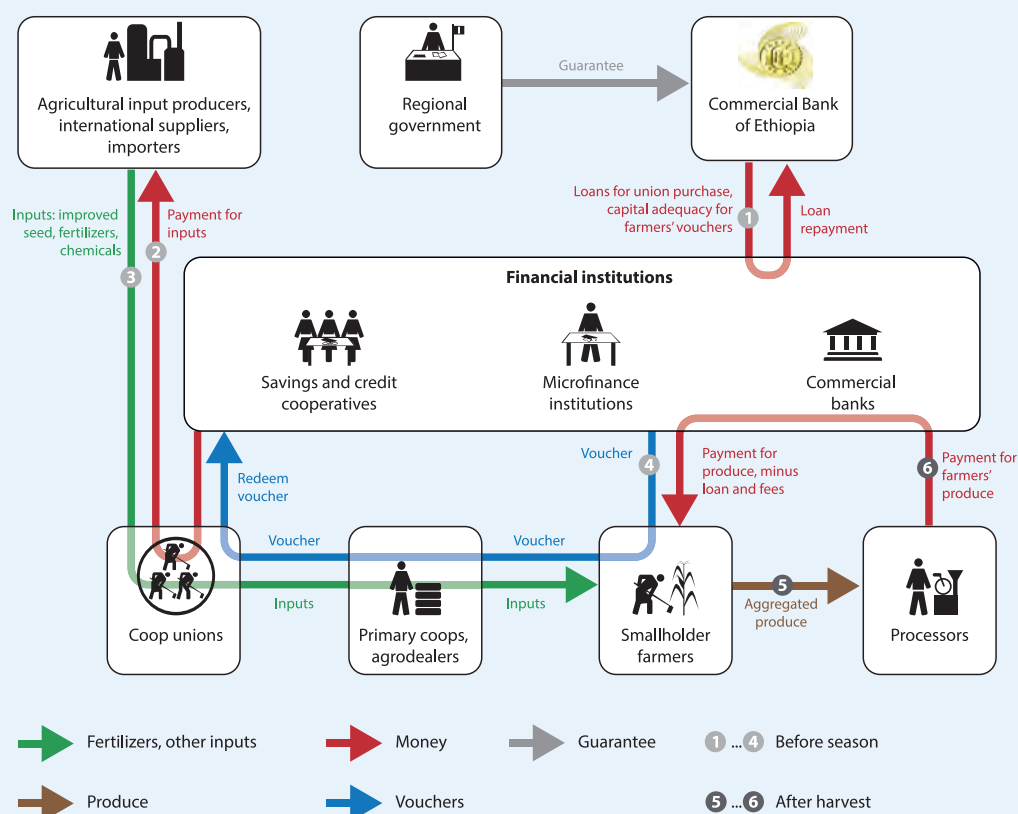


Figure 37: Input Voucher Scheme in Ethiopia

Opportunities

Although they are unsustainable in the long term and are of questionable efficiency, input-subsidy programs are likely to be an important feature of agricultural policy in Africa for the foreseeable future since they enable governments to demonstrate tangible support to their constituents (IFDC and IFA 2017, Jayne and Rashid 2013, Jayne et al. 2015). The focus should therefore be on improving their design, implementation and performance. Governments should aim to make this major expenditure as productive as possible by also investing in complementary measures to raise the productivity of fertilizers (Wanzala-Mlobela et al. 2013).

Subsidy programs should address challenges that have led to market failures and clearly define beneficiaries in accordance with overarching national strategic objectives. As Wanzala-Mlobela et al. (2013) argue, governments could view subsidy programs as an investment in the agriculture sector, contributing towards making the sector self-sustaining.

Private-sector involvement. Today's subsidy programs often rely on the private-sector distribution network. This opens opportunities for greater private-sector involvement. In Ghana and Nigeria, for instance, the state is actively promoting the private sector in the procurement and distribution of subsidized seed and fertilizer (Keyser et al. 2015). Mali and Burkina Faso are also moving to a private-sector approach in their subsidy programs, at least for fertilizer distribution. The coordination framework should integrate both public and private stakeholders through the various tiers and avoid redundancy and delays in procurement and distribution.

Smart subsidies. Smart subsidies also have the potential to support the development of private fertilizer markets and increase the availability and accessibility of fertilizers to smallholders. Some governments are trying to make their subsidies more market-friendly by introducing at least some attributes of smart subsidies (Wanzala-Mlobela et al. 2013). Some distribute vouchers for inputs, while others (such as Kenya and Nigeria) transfer e-vouchers, redeemable at private stockists, to beneficiaries' phones. However, concerns have been raised about delays in government payments, which greatly increase the costs and risks of doing business (Keyser et al. 2015, USAID-EAT 2012).

USAID has proposed a list of key principles for smart subsidy programs (Box 10).

Limitations to implementing smart subsidies should be overcome through fine-tuning or modernizing existing schemes. Basic infrastructure (information technology, banking, storage facilities, road networks, etc.) and financial inclusion exist in countries such as Kenya,

Nigeria, Tanzania and Rwanda, making it possible to embrace electronic-based subsidy programs. Given their current infrastructure, Burkina Faso, Ghana, Malawi and Mali would rather strive to improve the efficiency of their current paper-voucher programs.

Supporting and enabling infrastructure. To encourage the private sector to take over fertilizer supply and distribution to smallholders, governments need to increase investment in supporting infrastructure.

Reducing the market price of fertilizers. Governments should seek ways to reduce the market price of fertilizers (thereby eliminating the need for subsidies). Possibilities include reducing port and related charges, cutting non-tariff barriers to trade, improving access to finance, and strengthening the agrodealer network.

Extension and training. Farmers need to learn how to use fertilizers in the appropriate way, in combination with improved crop varieties and other inputs. This is especially important for non-organized farmers who are outside the main production zones (IFDC 2015b). Extension services should be strengthened and cover subjects such as integrated soil fertility, pest management and output marketing.

Complementary measures. Given that fertilizer alone cannot raise crop productivity, complementary measures are needed. These include improved seeds, updated fertilizer recommendations based on soil mapping and testing, soil and water conservation measures, and access to credit and markets.

Exit strategy. To avoid having subsidies being regarded as an entitlement and becoming a permanent drain on the national budget, programs should be designed with an exit strategy built in. Smart subsidies may be the route for doing this. Properly designed in partnership with the private sector, they could encourage farmers to use fertilizers, foster the private-sector distribution network, build relationships between farmers and agrodealers, encourage a gradual shift to a fully private-sector run, subsidy-free fertilizer delivery system, and enhance output market access and stabilize commodity prices. Such strategies are already in use in Nigeria and being piloted in Kenya and Zambia (AGRA 2018).

Analysis

Subsidies have generally increased the consumption of fertilizers and thus agricultural production (UNECA and AFFM 2018, Jayne and Rashid 2013). Some of the recent gains in production in West Africa have been attributed to subsidy programs, although total nutrient use still remains well below the level needed to transform agriculture production (NEPAD 2011).

Box 10. Key principles for smart subsidy programs

Inclusive participation. Promote private-sector development and participation by involving key stakeholders during the design of subsidy programs (public–private partnership).

Specialization. Define and assign the roles of all participating actors on the basis of specialization and comparative advantage to achieve complementarity.

Fair competition. Promote competition between private suppliers to drive down delivery costs and increase quality of services.

Efficiency. Promote economic efficiency (cost reduction, profitability, economies of scale, etc.). Favor market-based solutions. Link subsidies with other input-delivery systems for cash crops (cotton, cocoa, oil palm, coffee, etc.). Link multi-year contracts with performance.

Better targeting/equity. Improve targeting by involving village communities, local authorities and farmer organizations to focus on the right beneficiaries. Minimize the displacement of commercial sales (crowding out) by subsidized fertilizers that distort markets.

Transparency. Ensure transparency in the targeting and distribution system.

Timeliness. Rigorously plan to avoid delays. Reduce influence of political considerations.

Appropriate and quality products. Consider the most recent technical recommendations for each crop and agroecological zone to ensure that the appropriate fertilizer type is supplied. Follow quality specifications for fertilizer types, formulations, weight, labeling, etc.

Proper incentives. Favor market-based measures that do not undermine incentives to private-sector investments. Consider options such as guarantee funds and escrow accounts. Use information technology to track allocations and deliveries.

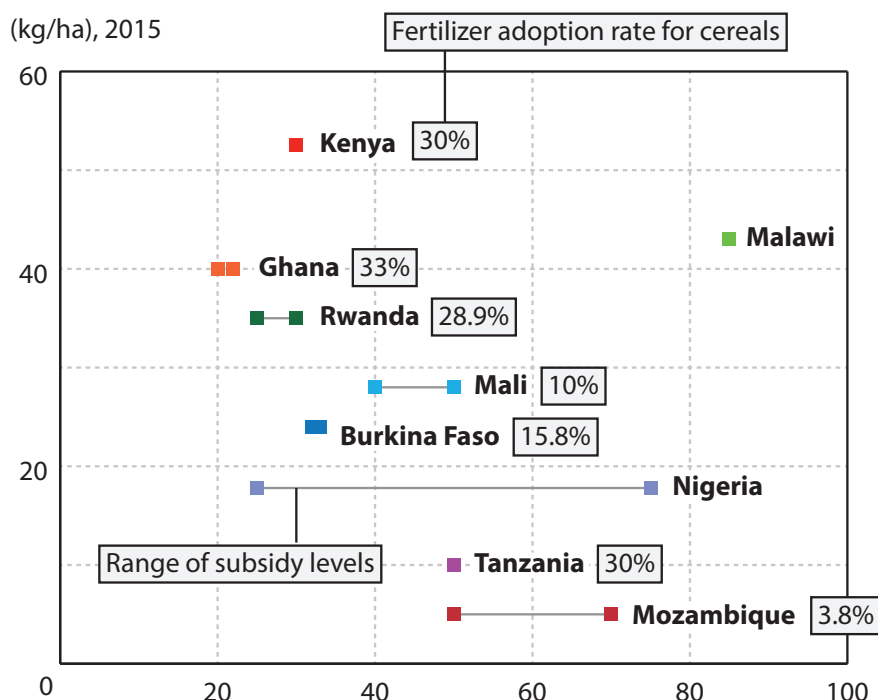
Complementary inputs. Promote fertilizer as part of a wider strategy that includes complementary inputs and strengthening of markets (seeds, equipment, irrigation, etc.), coupled with information and training (e.g., on crop management and integrated soil-fertility management).

Exit strategy. Devise a refocusing and exit strategy that includes clear timeframes and objectives. Shift the program focus from current to future beneficiaries (in terms of producers, areas, crops in need of subsidies). Gradually phase the program out completely.

Sustainability. Tie the subsidy to other public investments (e.g., for research and advisory services). Encourage savings schemes and remove barriers preventing input dealers from accessing loans. Improve physical infrastructure (irrigation, transport, storage, processing, and marketing) to attract the private sector.

Accountability. Monitor the program to gather reliable data based on specific indicators. Evaluate after each season to identify problems and possible improvements.

Source: USAID (2017)



Based on AGRA (2016b).

Figure 38. Fertilizer use, adoption rates on cereals, and subsidy levels in selected countries

Some countries, such as Nigeria, had a fixed range of subsidy rates where prices could fluctuate depending on the location: this allowed for the extra costs in some areas due to remoteness and other factors.

Among countries, there does not appear to be a correlation between the rate of subsidy and the average fertilizer application rate per hectare, or the area of cereals on which fertilizer is used (Figure 38). Indeed, if the Malawi outlier is removed, the correlation even appears negative: the higher the subsidy, the less fertilizer is applied per hectare. It is likely that subsidized fertilizers do not really go to the intended fields. They are often used on other crops or smuggled informally across borders. It is also likely that part of the subsidy funds is diverted by politicians for their own use.

Subsidy programs often reach remote and underserved smallholders who would not have otherwise used fertilizers. They can help to demonstrate the benefits of fertilizers and kick-start market development by raising demand among farmers for inputs at a large scale.

Conclusions

In general, subsidies increased fertilizer use and agricultural productivity. But they also increased government budget deficits, and were fiscally unmanageable and unsustainable. Governments

were forced to discontinue them during the structural adjustment programs of the late 1980s and early 1990s.

The policies did improve the environment for fertilizer businesses and increased the number of farmers using fertilizers, resulting in higher fertilizer consumption and crop production (UNECA and AFFM 2018, Jayne and Rashid 2013). The average fertilizer use in West Africa increased from 5–6 kg nutrients per hectare in 2002 to about 9 kg in 2011 (Keyser et al. 2015) and about approximately 17kg nutrients per hectare in 2019 (AFO 2019). Farmers who had never before used fertilizer on food crops became aware of their benefits. Higher consumption encouraged private importers and local blending companies to exploit economies of scale. Nevertheless, total nutrient use still remains well below the level needed to transform production (NEPAD 2011).

The 2016 launch of the Presidential Fertilizer Initiative enabled Nigeria to increase its crop yields and allowed the government to save \$200 million in foreign exchange by increasing the local production of soil- and crop-specific NPK products (IFA 2017, IFDC and IFA 2017, Heffer 2016) (Box 3).

Despite all the challenges and shortcomings, subsidies remain relevant to most countries in

sub-Saharan Africa. In 2016, subsidized fertilizers accounted for 12% of the total volume used in Zimbabwe, 28% in Malawi, 69% in Burundi, 92% in Rwanda and 100% in Ethiopia (IFA and IFDC 2017). This shows that the subsidies programs despite all the constraints are well underway in the continent.

Smart subsidies have the potential to support the development of private fertilizer markets and increase the availability of fertilizers for smallholders. Some governments have attempted to make subsidies market-friendly by introducing at least some attributes of smart subsidies (Wanzala-Mlobela et al. 2013). Some have used input vouchers, while others use electronic transfer or e-wallet systems using mobile phones, redeemable at private stockists

Recommendations

Governments need to adopt a more holistic strategy for raising smallholder crop productivity and income, focusing on sustainably raising the efficiency of fertilizer and improved seed use, including through smart subsidy programs.

What needs to change is the design and implementation of subsidy programs. Their design should address the challenges that have led to

market failures and clearly define the beneficiaries in accordance with the overarching national strategic objectives. The institutional framework for coordinating the activities should integrate public and private stakeholders through the various tiers of implementation and avoid redundancy and bureaucratic delays in procurement and distribution. Limitations in smart-subsidy programs should be overcome by fine-tuning or modernizing existing schemes.

Given that subsidies will persist for some time, they should be improved.

- **Exit strategy.** Subsidy programs should be redesigned with an exit strategy that facilitates the phasing over of the market to the private sector.
- **Smart subsidies.** Where communications infrastructure permits, voucher schemes should be converted to smart subsidies. This will reduce corruption and leakage, improve targeting, and ease the eventual phase-over to the private sector.
- **Inclusivity.** Both the private sector and beneficiaries should be involved in the redesign process.

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