



Agricultural input subsidies in Sub-Saharan Africa



Evaluation Study

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List of Abbreviations

AISP	Agricultural Input Support Programme, Malawi
AU	African Union
CAN	Calcium Ammonium Nitrate
CNFA	Citizens Network for Foreign Affairs
GDP	Gross Domestic Product
GFSP	Fertilizer Subsidy Programme, Ghana
GHS	Ghanaian cedis
NAIVS	National Agricultural Input Voucher Scheme, Tanzania
NDP	National Democratic Congress
NEPAD	New Partnership for African Development
NGO	Non-Governmental Organisation
NMB	National Microfinance Bank
NPK	Nitrogen Phosphorous Kalium (Potassium)
NPP	New Patriotic Party
MK	Malawian Kwacha
OPV	Open Pollinated Variety
SSA	Sub-Saharan Africa
USD	US Dollar
VDC	Village Development Committee
VVC	Village Voucher Committee
ZFSP	Fertilizer Support Programme, Zambia
ZMK	Zambian Kwacha

1. Introduction

The purpose of this study is to evaluate the experiences of recent applications of agricultural input subsidies in Sub-Saharan Africa (SSA). Subsidising agricultural inputs is controversial. On the one hand, agricultural input use in SSA is very low by international standards, and the hope is that subsidies may induce farmers to adopt the use of inputs and thereby increase agricultural productivity. On the other hand, many economists argue that agricultural subsidies of all kinds are expensive, mainly benefit the wrong people, and distort agricultural markets by encouraging farmers to overusing whatever is subsidised. The recent input subsidy programmes reviewed in this study attempt to meet these challenges by introducing so-called “smart” subsidies, which are specifically designed to maximise effects at the lowest cost (we will discuss smart subsidies in more detail below).

The overall objective of the evaluation study is to “...provide an assessment of smart subsidy programmes in SSA, focusing on obtained results as well as the way results have (or have not) been achieved, hindering and enabling factors, pre-conditions, etc.” (Terms of Reference, included in the Appendix). We evaluate the overall performance of selected input subsidy programmes, identify the most important factors affecting programme performance, and outline areas where knowledge is scarce or non-existent.

We have selected agricultural input subsidy programmes in four SSA countries, Malawi, Zambia, Ghana and Tanzania to form the basis for the evaluation study. The need to assess the subsidy programmes in some detail dictates our focus on relatively few cases. The Malawi programme has received a great deal of attention as an example of a successful input subsidy programme. It is massive in scale, targeting is based on a voucher system, and delivery of inputs to farmers is largely state-managed. It is also reasonably well documented in the literature. The large scale programme in Zambia provides an example of an alternative non-voucher targeting system and features state-driven delivery. The Ghana case demonstrates a relatively small programme with a very market oriented delivery system, and the Tanzania case provides insights into the targeting performance of a voucher scheme. Together, the selected cases provide considerable breadth in terms of differences in the scope, design, implementation and outcome of the programmes, as well as surrounding conditions.

The evaluation study is organised as follows: In the next section we discuss what is meant by “smart” subsidies. The economic philosophy which is the foundation of the concept of smart subsidies also forms the basis for our methodology as outlined in section 3. Section 4 evaluates each of the four cases and section 5 summarises the lessons learned and section 6 concludes.

2. Agricultural input subsidies

2.1. Agricultural inputs

We use agricultural inputs as a common term for a range of materials, which may be used to enhance agricultural productivity. Most important among these are fertilizers and improved seeds. All the programmes reviewed subsidise fertilizers, and most of them combine fertilizers with improved seeds in small packages.

The use of agricultural inputs is fundamental in modern agriculture in developed countries, and they were a primary ingredient in the green revolution that swept through Asia and Latin America during the '60s and '70s. However, the green revolution largely by-passed SSA, and the use of agricultural inputs remains very low. In 2002-2003 Sub-Saharan African farmers used on average 9 kg of fertilizers per ha of arable land compared to 100 kg per ha in South Asia, 135 in Southeast Asia and 73 in Latin America (Crawford et al, 2006). While agricultural production and productivity soared in Asia and Latin America during the last four decades, they have largely stagnated in Africa, resulting in a rising dependency on imported grains and an increase in the number of undernourished people (Wiggins and Brooks, 2010; Future Agricultures, 2010).

2.2. “Universal” vs. “smart” input subsidy programmes

Many African countries, including Kenya, Tanzania, Malawi, Zimbabwe and Zambia pursued large scale “universal” subsidy programmes from the 1960’s up through the 1980’s (Dorward, 2009). These programmes were characterised by a government-controlled input (and output) marketing system, in which farmers were supplied with agricultural inputs at controlled and subsidised prices, and often on heavily subsidised credit. The experiences under these programmes were mixed. The programmes succeeded in raising input use by farmers and increasing agricultural productivity in many cases. However, they were extremely expensive, most subsidies tended to benefit relatively well-off and better connected farmers, and the advances in agricultural productivity were dependent on continued government support. Further, the fertilizer subsidy programmes were prone to inefficiencies arising from high administrative costs, government monopolies and political manipulation (Banful, 2010b). As the subsidy programmes were dismantled and input markets liberalised as a part of the structural adjustment process in the 1980’s and 1990’s, input use and agricultural productivity declined (Crawford et al, 2006).

After a period of liberalised input markets by the end of the last century, new subsidy programmes began to emerge in several African countries. The Malawian government pioneered the return to large-scale subsidies in 1998, when it began distributing free fertilizer to farmers (Banful, 2010b). Other countries, such as Nigeria, Zambia, Tanzania, Kenya, Ghana soon followed Malawi’s example. In 2006, Abuja, Nigeria, hosted the Africa Fertilizer Summit under the auspices of the African Union (AU), the New Partnership for African Development (NEPAD) and the Government of Nigeria (Yawson, 2010). An important output of that summit was the Abuja Declaration on Fertilizer for African Green Revolution, in which AU member states set out to increase fertilizer intensity to an average of 50 kg/ha by 2015. One of the instruments in a five point action plan was to implement smart subsidy programmes to improve access to fertilizers for small-holder farmers.

Smart subsidy programmes are meant to address the shortcomings of the universal subsidies. To be “smart”, subsidy programmes should adhere to a number of design principles, which can be summarised under the following headlines (Minde et al, 2008; Tiba, 2009):

- **Targeting specific farmers.** Smart subsidies should be targeted specifically at farmers, who do not already apply agricultural inputs, as well as the poorest and most vulnerable households. This reduces the risks of displacing commercial (non-subsidised) input sales and promotes pro-poor growth.
- **Market-based solutions.** Smart subsidy programmes should utilise and support the further development of existing private input supply networks, rather than supplant them with state-controlled distribution systems. This enhances the efficiency of input delivery as well as increases the likelihood that the programme has a sustained impact after its termination.

- ***Exit strategy.*** Smart subsidy programmes should devise credible exit strategies to put a time limit on the support. This is primarily to reduce the risks that the programme becomes “hijacked” by political interests (Dorward, 2009) and to facilitate long term sustainability. If stakeholders expect the support to continue indefinitely they are less likely to prepare for self-sustained use of inputs on market terms. Also, a firm exit strategy helps control the costs of the programme.

The three characteristics are largely complementary. If subsidies are well targeted, the greater demand for inputs is likely to encourage potential entrepreneurs to establish new businesses, which promotes the development of a competitive input market. However, if the subsidised inputs primarily displace commercial input sales, private dealers are hurt by the “unfair” state-supported competition and may choose to exit the market, thereby reducing competition. Similarly, the more efficient is the targeting and input delivery system, the more effective and credible the exit strategy will be.

As we will see, none of the subsidy programmes considered in this study can be characterised as smart subsidies in the pure sense based on these criteria. They are based on the overall idea, and they all contain some of the elements mentioned above, but none of them go all the way.

3. Methodology

3.1. Assessment criteria

The characterisation of smart subsidies given above suggests that the concept is based on the economic principles of efficiency, equity and sustainability. We will therefore apply these principles as our assessment criteria. In the following, we briefly discuss each principle in relation to smart input subsidies.

3.1.1. Efficiency

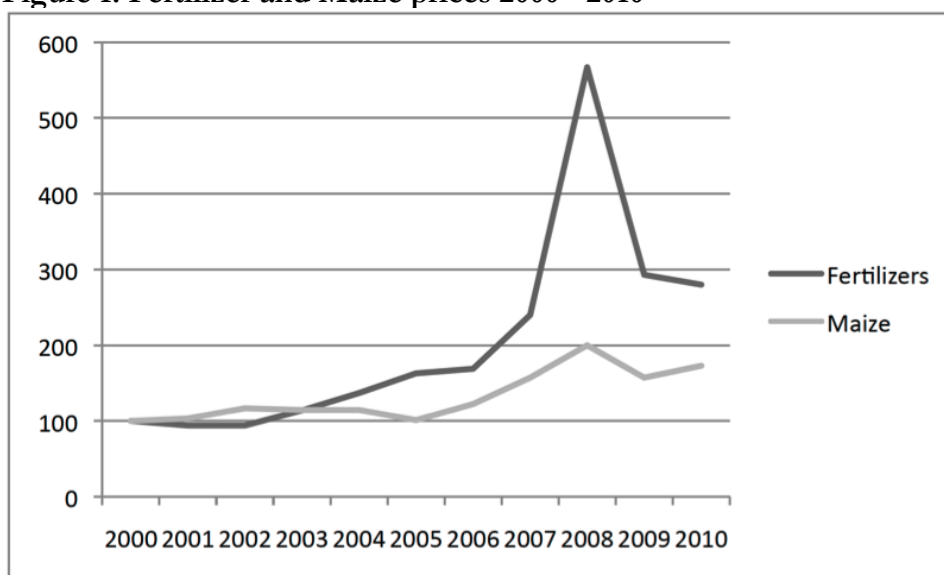
There is strong evidence to suggest that agricultural inputs raise productivity substantially, and that they are essential for sustaining intensive agriculture in the long term without depleting soil fertility (Crawford et al, 2006). The obvious question is therefore why so few farmers in SSA have adopted the use of agricultural inputs to capture some of these potential benefits. There are two possible answers to this question: 1) the economic costs of delivering agricultural inputs to the farmers are too high and the benefits in terms higher production too low for adoption of agricultural inputs to be a profitable investment; or 2) certain barriers, what economists call market failures, prevent farmers from realising the economic potential of agricultural inputs. If the first answer is correct, agricultural input subsidies are inefficient. Subsidies merely encourage the adoption of inputs, which are more costly to procure than the benefits they provide. If the second answer is correct, subsidies may be efficient as they help farmers overcome the market distortions generated by the market failures. The discussion below will elaborate on this view.

The first answer may be correct in some geographical areas and/or some periods of time. Due to poorly developed infrastructure, the costs of transporting inputs to remote areas, particularly in land-locked countries, are very high. Banful (2010b) suggests that around 50% of market fertilizer prices across SSA can be attributed to transaction costs compared with e.g. 20% in Thailand. If farmer density is also low, the potential demand for expensive agricultural inputs may be so low that agro-dealers will find it hard to cover the costs of setting up a shop. Coupled with relatively low agricultural productivity, the investment could simply be unprofitable, demand for inputs may not exist, and suppliers will be

unwilling to offer access to inputs. In such a case, input subsidies could boost demand and encourage input suppliers to expand their presence to remote areas. However, the subsidies would be inefficient. Some of the costs of supply would shift from farmers to the state, but the costs would still outweigh the economic benefits. Funding for subsidies could be better spent on policies aimed at lowering the transaction costs, such as infrastructure investments and market deregulation.

The profitability of agricultural inputs also varies significantly over time. Figure 1 shows the world market fertilizer and maize price indices from 2000-2010. From 2005-2008 the world market price of maize, one of the most important staple crops in SSA, almost doubled, which alone would make maize production more profitable. However, in the same period fertilizer prices rose much faster than output prices and reached record high levels in 2008. So if an investment in fertilizers more or less broke even in 2006, it would have become very unprofitable in 2008. Again, in this case an input subsidy would be inefficient as it would encourage unprofitable use of inputs.

Figure 1: Fertilizer and Maize prices 2000 - 2010



Source: World Bank, Global Economic Monitor (GEM) Commodities database.

Notes: Prices are real USD indices of world market prices.

The second possible answer to why agricultural input adoption in SSA is so low suggests that market failures exist to distort input markets and discourage farmers from using agricultural inputs. Examples of market failures most frequently cited in the literature are credit constraints, imperfect competition and risk of crop failure (Dorward, 2009):

- **Credit constraints:** If farmers are unable to obtain the necessary funding (or if credit costs are too high), they may not be able to make an otherwise profitable investment in agricultural inputs. This is what Dorward (2009) refers to as the affordability problem. A subsidy reduces the funding needs, but may not necessarily resolve the distortion completely, as farmers still have to cover the subsidised prices.
- **Imperfect competition:** If agricultural input markets are imperfectly competitive, input suppliers tend to charge higher prices in order to capture greater profits or to cover more inefficient business practices. This may result in farmers not being able to afford investments, which would be profitable with a more competitive market. In this case, an input subsidy can have both positive and negative consequences. It may increase aggregate demand, attract new entrants to the market and increase competition. However, if this does not happen, for instance

if the demand impact is too weak or if the subsidies are implemented in a way that favours incumbents, the subsidy may largely benefit the imperfectly competitive firms.

- ***Risk of crop failure.*** Investing in agricultural inputs is a risky business, particularly since many hybrid seeds and fertilizers require a reasonably well timed application and stable water supply. A season of prolonged drought can largely wipe out the entire investment and generate significant losses. Particularly the poorest smallholders are very vulnerable to poor harvests and may not be able to absorb the costs of a failed investment. Rather than risk losing everything, they may choose not to apply agricultural inputs, settling for a smaller but more stable surplus. Agricultural input subsidies increase the expected benefits of the investment and reduce the costs of a failed investment.

It follows from this discussion that input subsidies may be efficient if they counteract distortions generated by market failures and inefficient if they do not. However, market failures are hard to measure, and estimates of how subsidies affect their distortions are usually not available. In practise, it will be difficult to clearly distinguish between unprofitable input use and market failures. For instance, the time dimension complicates matters greatly. Looking only at 2008 when fertilizer prices were very high, we may come to the conclusion that fertilizer use was inefficient for many farmers and should be discontinued. However, a sudden drop in fertilizer demand could have detrimental effects on the input market by driving vulnerable suppliers out of business, which could over time exacerbate problems of imperfectly competitive markets and limited access to inputs in some areas. Would it in such cases be better to intensify subsidisation of inputs to prop up demand, thereby sacrificing short term efficiency for long term gains?

Another dilemma relates to the poor state of development of the private input markets in many SSA countries. Proponents of smart input subsidies (e.g. Minde et al 2008; Tiba, 2009) emphasise taking a market-oriented approach to ensure efficient delivery of the subsidised inputs to farmers. However, particularly in remote rural areas, private input suppliers may not exist because marketing costs are too high and the customer base is too small. Programme designers therefore face the dilemma of whether to pursue a market oriented approach or to establish a state-managed supply system. The former option would be more efficient and sustainable, but might not have the capacity to reach the remote areas. The latter option could more effectively ensure a broader geographical coverage, but could also risk undermining the development of a more competitive private input supply sector.

The choice is essentially one between greater efficiency and sustainability on the one hand and (geographical) equity on the other. However, the distinction between high transaction costs and market failures as causes of missing private markets influences the balance between efficiency/sustainability and equity. If the farmers' lack of access to privately supplied inputs is mainly due to high transaction costs, private input suppliers may be less willing to establish local outlets as they may expect demand to disappear again after the subsidies are phased out. On the other hand, if the missing markets are mainly due to market failures, a market oriented approach may help alleviate these market failures, for instance by enhancing competition in input supply. As mentioned above, the distinction is hard to make in practise, and the situation is likely to vary greatly between countries, or even regionally within countries.

Bearing these challenges in mind, we will make an assessment of the likely effect of subsidies on market distortions and the profitability of inputs, outline possible trade-offs, and identify areas where more knowledge is needed for a clearer assessment.

3.1.2. Equity

Agricultural input subsidies can be a useful instrument for promoting greater equality by targeting subsidies specifically at the poorest smallholders. However, it is not entirely clear whether such redistributive objectives are compatible with the efficiency criteria. On the one hand, the poorest smallholders are most likely the ones that are most constrained by market failures, such as credit constraints and vulnerability to the risks of crop failures. On the other hand, poor subsistence farmers may lack complementary resources, such as skills, scale of operation, productive assets, or the financial resources to pay even the subsidised prices, to make effective use of the subsidised inputs. In other words, use of agricultural inputs by poor smallholders may simply be unprofitable even if unconstrained by market failures.

Thus, there may be a trade-off between equity and efficiency objectives. If the primary aim of a subsidy programme is to achieve pro-poor growth, targeting the most vulnerable households may increase equality at the expense of efficiency. Similarly, an objective of increasing national self-sufficiency in grain production will require the programme to target the most productive households, who may be somewhat less-poor. Most of the programmes reviewed in this study have both objectives in some form. We provide an assessment of the programmes' intended targets, how well these targets are hit, and how well the programmes perform in terms of a general equity criterion.

3.1.3. Sustainability

Subsidy programmes are sustainable if they can be maintained over the long term without draining the public resources, or if the outcomes in terms of wider adoption of agricultural inputs and improved agricultural productivity persist after their termination. The universal input subsidy programmes pursued by many SSA countries during the 70's and 80's largely failed on both accounts.

Long term subsidy programmes may be economically justified as long as they meet efficiency and equity objectives. There are, however, political economy reasons to be sceptical about long term programmes. Subsidies represent a significant value, which is transferred from the state to farmers, suppliers and other stakeholders. As such, stakeholders have a great and obvious interest in the continuation and expansion of subsidies. In particular, when subsidies are rationed and targeted at specific groups, the people controlling how subsidies are targeted may exploit their power for personal gain. Policy makers may also be inclined to expand the government support irrespective of its performance, as it signals leadership and willingness to act. The politics of input subsidisation therefore carry a risk that the programme gains a life of its own, grows more inefficient and less equitable, and eventually becomes unsustainable.

To counter these effects, smart subsidies are meant to be a temporary measure designed with a clear exit strategy detailing the termination of the programme. A sustainable smart subsidy programme seeks to affect a permanent impact by a short term boost, or in other words to "kick-start" the market for agricultural subsidies. The permanent impacts can be achieved by alleviating the market failures plaguing the input markets directly or by raising the productive capacity of poor smallholders to a sufficiently high level that the market failures are no longer constraining. For instance, if the subsidy programme succeeds at permanently developing a more competitive private input supply, the lower prices will make inputs more widely accessible to smallholders. Similarly, if the programme helps smallholders accumulate productive and financial assets from a few years of surplus harvests, the farmers may be able to finance full-priced inputs from their own savings after programme termination. On the other hand, if market failures simply manifests again, once the programme ends the effects are likely to prove short-lived. The evaluation study will assess whether and how the subsidy programmes considered here are likely to have a lasting effect on potential market failures or households' assets.

3.2. The political economy of input subsidies

While the evaluation study will primarily focus on the economics of input subsidy programmes, the political economy of input subsidies cannot be completely ignored. Ideally, policies would be implemented to maximise national welfare, but it is naive to believe that personal political motivations do not play a role. In fact, Dorward (2009) argues that political economy difficulties are particularly problematic in poor rural societies, as 1) the potential personal and political gains from subsidy rents are very large relative to other income opportunities, so incentives for political manipulation are strong; and 2) fiscal resources are very scarce and costly to collect, so the adverse consequences of wasteful policies are great.

Irrespective of the economic justifications for large scale input subsidy programmes, their political benefits may be substantial. Input subsidies are effectively transfers of value from the government directly to recipients, so benefits are immediate and easily recognised. They may generate relatively fast and easily observable results in terms of greater food production, which allows policy makers to signal strong leadership and decisiveness. Subsidies can be narrowly targeted at specifically favoured constituents, while excluding others, and they may just as easily be taken away again if political objectives are not met. Thus, it is possible that the popularity of large scale input subsidy programmes in SSA is mainly due to their political attractiveness rather than economic superiority. Banful (2010b) suggests that historical anecdotal evidence supports this view. The universal subsidy programmes were maintained for many years in spite of strong indications of their inefficiencies and unsustainable drain on fiscal resources. It took heavy pressure from outside donors and the threat of imminent fiscal collapse to push through liberalising reforms.

3.3. Structure of the study

We structure the study of the input subsidy programmes into the following headlines, which consider the most important elements of smart subsidy programmes:

- **Background:** What were the motivations for the subsidy programmes?
- **Outcome:** What are the overall outcomes of the subsidy programmes in terms of increases in input use, agricultural productivity and output, changes in market prices, etc. and how do the benefits compare to the costs of the programme?
- **Scope:** What is the size of the programme, how wide does it cover and what is the extent of subsidisation?
- **Targeting:** What type of targeting and rationing mechanism (e.g. voucher) is used? Who controls beneficiary selection and which criteria serve as guidelines? How well were the intended targets reached?
- **Delivery:** How are the inputs delivered to the end users? Who supplies and who distributes the inputs. To what extent is the private sector involved? What is the risk of displacing commercial input supplies? Are inputs delivered in a timely and effective fashion?
- **Exit strategy:** Do the programmes exhibit a clear exit strategy, is it credible and has it actually worked as planned?
- **Assessment:** Based on the available information presented above, how will we assess the performance of the programme in terms of efficiency, equity and sustainability?

In section 4 we consider each of the four cases in turn, and in section 5 we summarise the lessons learned using the same headlines.

3.4. Selection of cases and literature

We have selected relatively few cases to form the basis of the evaluation study to allow a certain depth and detail in our scrutiny. The four cases are

- Malawi: Agricultural Input Support Programme 2005/6 – ongoing (AISP)
- Zambia: Fertilizer Support Programme 2002/3 – ongoing (ZFSP)
- Ghana: Fertilizer Subsidy Programme 2008 – 2009 (GFSP)
- Tanzania: National Agricultural Input Voucher Scheme 2008 – ongoing (NAIVS)

These four cases are the ones that show up most frequently in our literature searches. They provide a fairly wide variation in terms of programme size, objectives, targeting and delivery mechanisms, degree of success and empirical evidence. By choosing these cases, we aim at forming a reasonably clear picture of recent experiences with input subsidies.

The evaluation study is based on two types of literature, i) official programme documents, reviews and evaluations; and ii) empirical research papers. The first set of literature typically covers a broad range of issues, though not always in great depth. The second group investigates selected features (such as targeting, outcome, etc.) in more detail, usually based on relatively narrow samples. We focus on the most recent literature, partly to cover the latest evidence and partly because some of the programmes (particularly the ones in Tanzania and Ghana) are relatively new.

4. Selected input subsidy programmes in Sub-Saharan Africa

This section reviews and evaluates the four selected input subsidy programmes. Table 1 summarises the main features of the four programmes.

Table 1: Overview of the four case input subsidy programmes

	Malawi Agricultural Input Support Programme	Zambia Fertilizer Support Programme	Ghana Fertilizer Subsidy Programme	Tanzania National Agricultural Input Voucher Scheme
Outcome				
• % Output	23 - 54	89	-	-
• Economic returns	Positive, but small and volatile	Likely negative	-	-
Scope				
• Programme costs	USD 114 -285 million	USD 47 million	USD 14-26 million	USD 100 million/year
• % GDP	2-3	0.4	-	-
• % GDP in 2008/9	7	0.9	0.05 – 0.1	0.4
• % Subsidy	64-79	60	-	-
• % Subsidy in 2008/9	91	80	50	50
• % households covered	50-65	-	-	45
Targeting				
• Targeting mechanism	Voucher	Farmer registry	Voucher	Voucher
• Package size	50 kg fert. + 2-4 kg seed	400 kg fert. + 20 kg seed	No standard package	100 kg fert. + 10 kg. seed
• Beneficiary selection	Village Development Committee	Farmer cooperative	Extension officers	Village Voucher Committee (locally elected)
• Targeting criteria	Priority to vulnerable households	Relative less poor households	None	Emphasising ability to pay for and use inputs
Delivery				
• Input supply	Contracted private firms	Contracted private firms	Large private importers	Private sector
• Input retail	Mainly parastatal	Contracted private warehouses	Private sector	Private sector
• Subsidy redemption	Retailers	Farmer cooperative	Fertilizer importers	National Microfinance Bank
Exit strategy				
• Clear exit strategy?	None	2-year benefit, 3-year prog.	Single year programme	3-year benefit, 3-year prog.
• Exit strategy enforced?	-	No	One-year extension	Ongoing

4.1. Malawi, Agricultural Input Support Programme/Farm Input Support Programme (AISP)¹

4.1.1. Background

In Malawi 88% of the population lives in rural areas and slightly more than half of these are poor. The rural households are almost exclusively maize producers, but only 10% of them are net sellers, whereas around 60% of smallholders are net buyers of maize. This dependency on market purchases of maize leaves poor households vulnerable to the high and volatile maize prices usually observed in Malawi. Thus, the political motives for supporting improvements in agricultural productivity are largely driven by a desire to increase smallholder self-sufficiency in maize production and reduce their exposure to maize market risks. As formulated by Chinsinga (2011), “In Malawi, maize is politics, and input subsidies are central to this”.

The Agricultural Input Support Programme (AISP) in Malawi, initiated in the 2005/6 season, builds upon a long tradition of subsidising agricultural inputs.² The recent wave of “smart” subsidies started with the establishment of a programme to distribute free “starter packs” in 1998/99, initially to all households, but by 2001/2 to a more limited number of targeted households (Targeted Input Program, TIP). This starter pack programme provided valuable experience in beneficiary targeting and establishment of logistics systems to distribute the inputs to rural households. Partly as a result of these early attempts, Malawian farmers were even prior to the AISP some of the most intensive fertilizer users in Sub-Saharan Africa, using around 30 kg/ha compared with a SSA average of 9 kg/ha. As the TIP was scaled down in the 2004/5 season, Malawi was hit by bad weather resulting in a very poor maize harvest, which translated into high prices and acute food shortages (Chibwana et al, 2010). In response, the Malawi government reintroduced large scale input subsidies in the form of the AISP in 2005/6. The overall objective of this programme is to “...increase resource poor smallholder farmers’ access to improved agricultural inputs in order to achieve food self-sufficiency and to increase resource poor smallholder farmers’ income through increased food and cash crop production” (Dorward et al, 2010, p. 12).

4.1.2. Outcome

The AISP appears to have had a substantial effect on maize output, but some uncertainty surrounds the estimates due to other factors (e.g. the weather) influencing the data. Official estimates suggest that national maize harvests increased by around 1 million tonnes in 2005/6 rising to more than 2 million tonnes in the 2008/9 season (around 54% and 114%) compared to the 2002/3 and 2003/4 seasons. These estimates are, however, highly contentious. More conservative estimates by Dorward et al (2010) based on assumptions about average maize responses to fertilizer, put the increase in maize output at around 400,000 tonnes in 2005/6 to 1,000,000 tonnes in 2008/9 (corresponding to an increase of 23% and 54%) compared to pre-AISP harvests. These estimates by Dorward et al (2010) are derived by multiplying the estimated increase in fertilizer use with an estimated average fertilizer response rate, adjusting for weather, use of improved seeds and delivery delays. For the lack of better statistics, this approach seems reasonable, but the estimates must be viewed as highly uncertain.

A few studies have tried to quantify the impact of the input subsidy based on a more stringent scientific (econometric) methodology. Ricker-Gilbert and Jayne (2010) try to estimate the dynamic effects of the

¹ This section is based on Dorward et al (2010) and Dorward and Chirwa (2011) unless otherwise specified.

² The programme changed its name to Farm Input Support Programme (FISP) in 2008/9. As the new programme is essentially a continuation of the old AISP, we refer to the whole programme by AISP.

AISP. They find that a fertilizer subsidy significantly increases maize production within the same year, and there are some indications of positive effects on maize production in subsequent seasons but these are surrounded by greater uncertainty. On the other hand, they find little evidence of a long-term effect on household assets or general wellbeing.

An impact assessment based on household surveys by Chibwana et al (2010) suggests that the programme increased maize yields of recipient farmers by 447 kg/ha (around 42%), of which just over half (249 kg/ha) can be attributed to fertilizers and the rest to improved seed. Such production increases are within the range estimated by Dorward et al (2010) mentioned above. Chibwana et al (2010) also report that the AISP caused some change in cropping patterns, as farmers reallocated land from alternative food crops such as cassava or sweet potato towards maize. To the extent that fertilized maize is more productive, this shift represents a further expansion in food production, but it may also increase risks of crop failures as cassava is more resistant to droughts than maize (Barratt et al, 2006). It is not possible to assess the severity and implications of these effects based on the available material.

The evidence reviewed above indicates that the expansion in maize output is sizeable, and it is therefore all the more puzzling that the effect did not translate into an observable decline in maize prices. During the decade preceding the start of the AISP, average local maize prices oscillated around a price of USD 0.2/kg (1990 prices), perhaps with a slightly declining trend. The larger harvests obtained from 2005/6 onwards did not result in the anticipated drop in maize prices, and prices following the 2008/9 record harvest actually rose by almost 100% over the previous season. A number of possible explanations are offered, among which the most important is that demand seems to have increased at least as fast as supply. For instance, partly due to official overestimation of maize harvests in 2007, the government contracted with the government of Zimbabwe to export 400,000 tonnes of maize to Zimbabwe. The government managed to export only around 283,000 tonnes before suspending the contract due to rapidly increasing domestic prices (Minde et al 2008). Similarly, in 2009/10 the government added 130,000 tonnes of maize to the strategic grain reserve and private traders accumulated a further 100,000 tonnes (Dorward et al 2010). A second reason for the exceptionally high maize prices following the 2008/9 season could be the extremely high fertilizer prices during this season, which are partly passed through to output prices. Although beneficiaries of the AISP were shielded from the fertilizer price increase, it is likely that more commercially oriented farmers supplying the maize market as well as maize importers were more exposed.

Evidence on the effects on poverty is harder to obtain. Dorward et al (2010) reports on findings from focus group discussions, which suggest that rural real wages increased continuously over the AISP lifetime even for poor non-beneficiaries. As maize production by AISP beneficiaries increases, the households' dependence on off-farm work is reduced and more jobs are available for non-beneficiaries and land-less poor. It is not possible to judge how strong or widespread such effects were, or to which extent the reported reductions in poverty rates can be attributed to the AISP.

Dorward et al (2010) calculates the economic returns of the AISP based on their estimates of the effect on production. The economic returns, defined as the net benefits relative to total costs, vary considerably depending on the weather, maize and fertilizer prices, assumptions about yield responses, etc. Assuming a moderate yield response, the estimates suggest that the very good conditions prevailing in the 2006/7 season produced decent economic returns of around 54%, implying that a USD 100 investment in programme activities generated a USD 154 worth of output. More modest returns were achieved in the 2005/6 (despite plentiful rains) and 2007/8 seasons (12% and 6% respectively). However, the 2008/9 season generated negative returns despite good weather and high maize prices due to extremely high fertilizer prices. In conclusion, these estimates suggest that economic returns are likely to be modestly positive on average but with a high degree of volatility.

4.1.3. Scope

The AISP is a massive programme, and the scope of the programme has expanded continuously over its lifetime, as illustrated in table 2 below. By the 2007/8 season, the programme provided what amounted to an average 79% subsidy to 59% of all farming households. Total costs were around USD 117 million, corresponding to 3.4% of GDP (9% of the total government budget). The following season 2008/9 was exceptional due to extremely high fertilizer prices. The government decided to keep the prices paid by farmers constant and absorb the input price increase. As a result, the subsidy ratio averaged 91%, and the total costs of the programme jumped to almost USD 285 million (6.6% of GDP and 16% of the public budget). Fertilizer prices have come down again somewhat since 2009, but we do not have any later figures on programme expenditure. Initially, the programme subsidised mainly maize fertilizers and to a lesser extent tobacco fertilizers, but it has since then branched out to include maize seeds (of which 84% were hybrid), as well as a bit of cotton seed, legume seed and cotton pesticides.

Table 2: Scope of the AISP in Malawi

	2005/6	2006/7	2007/8	2008/9
Programme budget (USD million)	36	54	82	139
Programme costs (USD million)	51	91	117	285
% of GDP	2.1	3.1	3.4	6.6
% budget overrun	42	69	43	105
% household coverage	N/A	54	59	65
% subsidy	64	72	79	91

Source: Dorward et al (2010)

4.1.4. Targeting

The AISP is based on a voucher system. Selected recipient households receive two coupons, each of which can be redeemed for a bag of maize or tobacco fertilizer or a bag of maize seed (hybrid or Open Pollinated Variety, OPV).³ The fertilizer bags carry an additional fixed price (MK 950), but the seed bags require no extra expenditure. Thus, in effect AISP offers an input subsidy as well as an input price control mechanism, under which the programme absorbs all input price variations. This is both a strength and a weakness of the programme. On the one hand, the stability of input prices ensures that smallholders can gradually build capacity for applying inputs, maintain soil fertility, and procure improved seeds season after season. Small input suppliers may develop and solidify their businesses without sudden demand disruptions. On the other hand, when the government carries all the risk, programme costs are difficult to control and the intervention risks becoming unsustainable. In all years, the realised programme costs were over budget, in 2008/9 by more than 100% (see table 2 above).

Coupons are printed centrally and distributed to the district level. Initially, the distribution of vouchers to districts was based on historical cropping patterns, but from the 2007/8 season greater emphasis was

³ Maize fertilizer consists of a 50kg bag of 23:21:0 +4s or Urea, tobacco fertilizer covers a 50 kg bag of Compound D or Calcium Ammonium Nitrate (CAN), and maize seeds come in 2kg bags of hybrid seeds or 3-4kg bags of OPV seeds.

placed on the number of farming households. At the district level, Traditional Authorities allocated the vouchers among villages and the local Village Development Committees were responsible for identifying recipients. The official criteria for determining beneficiaries are not very precise. They mainly stipulate that recipients should own land being cultivated in the relevant season and that priority should be given vulnerable groups, particularly female-headed households. As a result, much discretion was left to village chiefs and there appears to be considerable variation between regions. Household surveys suggest that coupons were disproportionately allocated to households with relatively more land more assets and to male-headed households. Such evidence is supported by Chibwana et al (2010) who found that the most vulnerable and female-headed households were less likely to receive vouchers, whereas long term residents of villages were more likely to be selected.

Inappropriate targeting of programme benefits risks displacing commercial input sales, if recipients would have bought agricultural inputs anyway in the absence of subsidies. Commercial sales displacement represents a shift in input sales from non-subsidised to subsidised sales and does not increase the total use of agricultural inputs. A high degree of displacement is therefore detrimental to programme effectiveness. No firm data exists on the extent of displacement, but Dorward et al (2010) suggest that around 30% of subsidised maize fertilizer sales would have taken place on commercial terms if there had been no support. These estimates are based on examinations of changes in aggregate sales in 2005/6 and 2006/7, and the authors refer to supporting evidence from a panel data analysis of farmer purchases. If such estimates are correct, displacement represents a substantial reduction in the effectiveness of the programme. Even worse it undermines the efforts to develop a competitive private input supply sector, as private suppliers that are not part of the programme face strong state-subsidised competition.

4.1.5. Delivery

Farmers can redeem vouchers at retail outlets of firms, which are selected each season through tender. Wholesale supply (imports) of fertilizers is mainly undertaken by large private firms, but two large parastatals, ADMARC and SFFRFM, dominate the distribution and retailing of fertilizers to the households. In the 2006/7 and 2007/8 seasons, a few large private companies (also involved in importation and wholesaling) with developed retail networks were authorised to market some of the inputs and were responsible for 24-28% of subsidised fertilizer sales, but in the 2008/9 season no retail contracts were awarded to private distributors. The very limited involvement of the private sector in input distribution may in part have been due to distrust between the government and the private sector (Dorward et al, 2008).

The market for improved maize seeds is largely private, with both large retail chains and smaller independent agro-dealers distributing subsidised seed. Supply of improved seeds is, however, dominated by multinational corporations, including Monsanto, which alone controls 50% of the market (Chinsinga, 2011). This concentration of market power is exacerbated by the AISP, partly due to political priorities. The subsidy programme offers both subsidised hybrids, which are exclusively imported by multinationals, and OPV maize seeds, which are supplied by local seed companies. Chinsinga (2011) argues that over the life time of the programme attention has shifted more and more towards hybrid seeds. Hybrid maize seeds generate higher yields than OPVs and are therefore more attractive for policy makers, who want to show fast results. However, NGOs argue that OPVs are more suitable for smallholders, as they are more resistant to pests and diseases, more drought resistant and more familiar to farmers. Crucially, harvested OPV maize may be retained as seeds for the next season, unlike hybrid seeds, which must be bought from the market each season. Thus, adopting subsidised hybrid seeds may generate a dependency on the multinational producers, which may prove devastating for smallholders once subsidies are phased out.

The efficiency of the programme is also affected by the timing of deliveries and the extent of fraud and corruption by programme stakeholders. In Malawi, agricultural inputs should be available to farmers by end of November to ensure their effective use. Although the timing of input deliveries has improved over the lifetime of the programme, only 30% of all sales had arrived by end November in 2008/9 season, most of the rest was delivered during the following month. Taken together with relatively high displacement rates, late delivery is detrimental for the objective of increasing fertilizer use. Recipients of input vouchers may hold off purchases of inputs on commercial terms in the expectation of receiving subsidised inputs shortly. If these inputs are delivered too late, farmers may actually end up reducing input use rather than merely displacing commercial inputs.

The extent of fraud and corruption is difficult to determine, but fragmental information based on focus group discussions and household surveys suggests that some problems do exist (Dorward et al, 2010). A small number of households (5%) report having to pay a fee for gaining access to vouchers and an estimated 14-20% of vouchers were redeemed together with a small 'tip' on top of the regular beneficiary co-financing. There were also reports of voucher counterfeiting, which in 2008/9 accounted for 27% of sales by parastatals and 3% of private retail sales. Dorward et al (2010) suggests that the better performance of private retailers could be attributed to the fact that they were much faster at returning vouchers to the programme for final settlement, which allowed rapid identification and termination of counterfeiting schemes.

4.1.6. Exit strategy

The programme does not appear to have any exit strategy. It has been in effect for 6 years, and its budget has expanded continuously throughout its lifetime, from MK 5.1 billion in 2005/6 to MK 21 billion in the 2011/12 budget (Government of Malawi, 2011). There are no indications that a phase out of the programme is planned in the future.

4.1.7. Assessment

All evidence indicates that the Malawi AISP has a substantial positive effect on the use of agricultural inputs, agricultural productivity and food production. However, the gains come at a massive cost to the Malawi government budget (direct donor support only covered 5% of total programme costs in 2008/9), which could alternatively be used for investing in infrastructure, education, health, etc. The best estimates available on the economic returns of the programme appear to be positive but also relatively modest and highly volatile depending on input and output prices, weather conditions, displacement rates and efficiency of programme administration.

One of the most important sources of uncertainty is the design of the instrument as a variable subsidy with a fixed farmer payment. This provides the greatest degree of security to farmers, as they are shielded from input price volatility. However, it also reduces the overall efficiency of the programme. The high fertilizer prices in 2008/9 were a signal from the market that fertilizers were in short supply. From an efficiency point of view it is better in such a situation to economise on the use of fertilizers, which would most likely have taken place if farmers faced at least a part of the price rises. In the event, total subsidised fertilizer sales declined only slightly resulting in massive budget overruns.

Usually, some efficiency must be sacrificed in favour of a more equal distribution of resources. However, the review of the AISP suggests that the objective of targeting the most poor and vulnerable households is very difficult to achieve for two reasons. Firstly, there must be some mechanism for identifying worthy beneficiaries, in this case Village Development Committees (VDCs). Although there seems to be scope for fine-tuning targeting criteria, VDCs will still have considerable discretion in allocating vouchers, leaving room for abuse of powers, rent seeking and influence by local politics. The

most vulnerable are unlikely to rank highly with such priorities. Secondly, households need to have a certain minimum productive capacity to be able to use the subsidised inputs effectively, such as skills, land, financial resources, complementary assets and labour. On the other hand, although the poorest households are not targeted directly, they may still gain indirectly by lower food prices and greater job opportunities provided by the general improvements in agricultural productivity. Lower food prices did not materialise in Malawi following the implementation of the AISP, but Dorward et al (2010) suggest that rural real wages may have increased anyway by a tightening of the rural labour markets.

There is considerable risk related to the long-term sustainability of the programme in its present form. Total costs are extremely high relative to the government budget and the total economy. What is worse, the budget has been increasing steadily throughout its lifetime and it has proved difficult to control as evidenced by high and increasing budget overruns. These trends are exacerbated by the lack of credible exit strategy. It is questionable whether the Malawi government is able to bear the burden in the long run.

A second aspect of sustainability is the extent to which the higher adoption of agricultural inputs is likely to persist after a possible future programme termination. This is doubtful. There is little to suggest that programme activities have addressed the underlying barriers to a well-functioning agricultural input market, such as a thin private input supply network, lack of access to credit and high costs of input delivery. Distribution and retailing of fertilizers is still dominated by parastatals, and there seems to be little scope for new suppliers to capture a share of the market, though the market for improved seeds appears to be more competitive. The high financing and transaction costs are not reduced but merely shifted from farmers to government. A sustainable outcome could be achieved if beneficiaries were able to accumulate sufficient financial and productive assets to overcome the market barriers on their own after programme termination. However, the little evidence that exists (Ricker-Gilbert and Jayne, 2010) suggests that such capital accumulation is not happening. Should the AISP be dismantled in the future, there is a substantial risk that much of the gains in terms of more widespread agricultural input adoption will be reversed.

In conclusion, the Malawi AISP has a large effect on productivity and output, but the programme is very costly, it largely fails to target the most vulnerable households and its long term sustainability is questionable.

4.2. Zambia, Fertilizer Support Programme (ZFSP)⁴

4.2.1. Background

The Fertilizer Support Programme (ZFSP) in Zambia follows earlier attempts at stimulating the adoption of agricultural inputs, mainly fertilizers and hybrid seeds, in the production of maize. Earlier programmes focused less on direct subsidies and more on controlling input prices and making sure that inputs were available to smallholders through state-managed production and distribution. Indirect and unintentional subsidisation was provided in the form of state-provided credit, of which only 5%-10% was recovered.

In 2001 the government estimated that only 30% of smallholders had access to improved seeds and just 20% had access to fertilizers. Small-scale farmers had too few financial resources to generate sufficient demand to support a competitive private input supply sector. In this context, the ZFSP was launched at

⁴ This section is based on World Bank (2010) unless stated otherwise.

the start of the 2002/3 agricultural season. It sought to break from earlier programmes by subsidising inputs directly rather than providing credit and by focusing on the development of a competitive private input supply sector rather than relying on state-managed distribution. Specific objectives of the programme can be summarised as

1. To ensure timely, effective and adequate access of smallholder farmers to agricultural inputs in the form of fertilizer and hybrid maize seeds
2. To facilitate the development of a competitive private sector in the supply of agricultural inputs
3. To facilitate the process of farmer organisation, dissemination of knowledge and creation of other rural institutions that will contribute to the development of the agricultural sector.

4.2.2. Outcome

Although evidence suggests that the ZFSP was less effective than anticipated by the government, it does appear to have a substantial effect on maize yields and production of participants. In designing the programme, the government expected that farmers were able to achieve a maize yield of 3 tonnes per hectare, almost a trebling of average yields among smallholders in Zambia. Instead, a survey conducted by the end of the 2007/8 season showed that participants achieved an average yield of around 2 tonnes per hectare, albeit with large regional variations.

In aggregate, World Bank (2010) estimates that total production in Zambia increased by 146,000 tonnes of maize 2007/8, corresponding to 89% growth in output as a result of the ZFSP. This increase covers output due to higher yields (estimated as 82,000 tonnes or 50% yield increase) as well as expansion in the area cultivated by maize (around 64,000 tonnes). These estimates are characterised by considerable uncertainty. They are based on a household survey of ZFSP beneficiaries, the results of which are extrapolated to the national level. In the survey, farmers are asked how much they produced in the current season compared with seasons prior to support from the ZFSP. So the estimates are derived from farmers responses (partly based on their recollection of past production), and there are apparently no attempts at controlling for factors unrelated to the programme. They are, however, the best estimates available.

The World Bank (2010) study also estimates the total costs of the programme, amounting to ZMK 183 billion, or USD 47 million, including direct costs of the inputs, administration and logistics, as well as the indirect costs of salaries paid to government staff in proportion to the resources spent on the programme and farmer contributions. These cost estimates imply that the increase in maize supply was made possible at a cost of around USD 325 per tonnes at the farm gate. In comparison import prices fluctuated between USD 295 and USD 406 per tonnes during the period under investigation (2007-2009).

On the face of it, this suggests that the programme has been reasonably profitable from a national perspective. There are, however, costs that are not sufficiently accounted for in the estimate. Applying agricultural inputs, particularly fertilizers, is more labour intensive and the opportunity costs of labour are not included. Also, farm gate prices do not include the often considerable transport costs to urban centres. Finally, a substantial part of the incremental production is attributable to an increase in the area cultivated by maize. To the extent that the increase in maize plantings is brought about by displacing alternative crops, the value of the displaced crops should be added as a further opportunity costs. Even where land is “free”, continued land expansion may not be sustainable in the long run. If the effect on land expansion is factored out, the resource costs of the ZFSP amount to USD 579 per tonnes, substantially higher than the import prices. As a means of increasing food security in outlying areas, the

ZFSP may provide reasonable value for money, but as a source of increased national food supply the programme appears to be largely uncompetitive.

4.2.3. Scope

The ZFSP is designed to reach around 125,000 farming households, although in 2006/7 and 2008/9 the government budgeted for some 200,000 households. It is not entirely clear why the planned number of beneficiaries changed so much over time, but it may have something to do with the government budgeting process. According to government funding rules, the total budget for the programme must be negotiated each fiscal year and substantial variation in the budget from year to year is possible. This is also a source of serious administrative difficulties as discussed in more detail below.

The ZFSP subsidised inputs by around 60%, but the government contribution increased to as much as 80% following the extremely high fertilizer prices during the 2008/9 season. In total, the USD 47 million estimated cost of the programme in 2007/8 corresponds to around 0.4% of GDP and 1.6% of the public budget (the budgeted costs for 2008/9 season amounted to around 0.9% of GDP. Although not as massive as the Malawi AISP reviewed above, the programme is still considered large scale.

4.2.4. Targeting

Farmer cooperatives, specifically approved by the government, play a central role in identifying beneficiaries and collecting the farmers' payments, which are deposited before the inputs are handed out. According to the targeting criteria, recipient households should

- be an active small-scale farmer
- have the capacity to cultivate between one and five hectares of land,
- be able to cover 40% of commercial input prices,
- should have no prior history as a defaulter in earlier government subsidised credit programmes.

In addition, farmers need to be a member of the cooperative to benefit from the ZFSP. Each beneficiary household is entitled to pick up a package of agricultural inputs, consisting of sufficient amounts of fertilizers and hybrid seeds to cultivate one ha. of land using the dosage recommended by the government.⁵ Compared to the value of the vouchers distributed by AISP in Malawi, the ZFSP packages are considerably larger, by a factor of around 8-10.

The selection criteria as well as the size of the input packages reflect a focus on relatively less-poor farming households. The stipulation that beneficiaries should be able to cultivate at least one hectare of land effectively excludes the 40% poorest smallholders, who own less land (Minde et al 2008). Also, the large input packages and the requirement that beneficiaries are members of an approved cooperative, which demands a membership fee, also serves to discriminate against the poorest. The bias against the poorest smallholders is reflected in the evidence characterising the recipients. Surveys of recipients reveal that more than 85% of farmers receiving support in 2007/8 cultivated one hectare or more of land (Minde et al 2008), and 35% of beneficiaries owned draft animals compared to a national average of around 11% (World Bank 2010). This suggests that the ZFSP largely hit their intended targets, but these targets were not the poorest smallholders.

⁵ Specifically, one package consists of four 50kg bags of compound D basal fertilizer, four 50kg bags of urea top dressing, as well as one 20kg bag of hybrid seeds (in short 20 kg seed + 4x4 fertilizer).

Targeting the less-poor households risks undermining the effectiveness of the programme through displacement of commercial input sales, as these households are more likely to be able to finance input purchases on market terms. Evidence to this effect is mixed. A survey of ZFSP beneficiaries suggests that 50% of recipients of subsidised inputs bought inputs from private shops before receiving ZFSP support generating a strong potential for displacement. However, the same survey revealed that 43% continued to complement their subsidised package with inputs purchased on commercial terms from private suppliers. It is not clear whether these households reduced their purchases of private inputs, or to which extent the subsidised packages inspired farmers to adopt agricultural inputs more widely. The World Bank (2010) study concludes that displacement constituted at least 7% of subsidised sales, generated by the recipients who stopped purchasing commercial inputs. However, this number could be significantly higher if the remaining 43% commercial customers also purchased less than before.

4.2.5. Delivery

The supply and distribution of the subsidised inputs are relatively centralised. Private sector involvement is sought through a tendering procedure, but in practice private sector involvement is limited. Compound D, one type of fertilizer, is usually supplied by a state-owned company (Nitrogen Chemicals of Zambia). Contracts for urea, another type of fertilizer, are typically awarded the same two large private firms (Omnia Small Scale Limited and Nyiombo Investments Limited).

This apparent lack of competition in fertilizer supply is reportedly due to a general limited capacity of the private sector. However, when potential competitors to the 2-3 dominating firms are effectively excluded from participating in the programme, there is little chance that they may develop this capacity. This represents a fundamental dilemma in input subsidy programmes between the need to ensure smallholder access to subsidised inputs and the objectives of developing a more competitive private input supply sector to promote long term sustainability.

The seed market appears somewhat more competitive, with several firms supplying different seed varieties (seven firms in 2008). Contracts for distributing and storing the inputs until farmers pick up their packages are awarded smaller private distributors and warehouse owners. The activities are, however, still centrally managed and there does not seem to be any trading and marketing of subsidised inputs by private dealers themselves.

One of the main difficulties related to delivery of subsidised inputs to farmers is serious delays in arrival. According to ZFSP guidelines, inputs should be available for retrieval by farmers by end of October so the inputs can be applied by the beginning of the agricultural season in November. A survey of beneficiaries indicates that in 2008 less than 4% of subsidised inputs was distributed by end October and 69% of recipients reported that they did not get their inputs until after the start of the rains.

The timing problems are related to government budgeting procedures and programme administration. The fiscal year in Zambia runs from 1 April to 31 March. As budget allocations to the ZFSP have to be negotiated each year, stakeholders do not know how many subsidised input packages can be distributed until the budget is approved by parliament in March. After final approval, the tender for supply and distribution of the inputs can be prepared. In 2008, the tender procedure ran throughout the summer and the winners were announced in August, a few months before the inputs were to be delivered. It should be noted that from 2010 the government was to change the fiscal year to match the calendar year, giving ZFSP administrators three more months to prepare activities. We have no information on whether this change has helped overcome the timing issues.

Evidence of misuse is very limited. There are some indications that input packs went missing in the distribution process. The World Bank (2010) notes an average 20% discrepancy between the number of packages the district officials say they released and cooperatives report to have received. It is not known what became of the missing packs, and some of it may simply be due to accounting errors. The large majority of farmers surveyed reported satisfaction with the quality of inputs they received.

4.2.6. Exit strategy

Originally, the programme was designed to run for three years, 2002/3 – 2004/5. Each of the 125,000 beneficiary households was expected to “graduate” from the programme after two consecutive years. In the first year, households were to benefit from the full subsidy and in the second year, the subsidy would be halved. In practise, however, the exit strategy appears to have had little effect. The programme has been extended continuously, and the graduation mechanism is not working as planned. The responsibility for implementing the graduation mechanism rested with the farmer cooperatives, who identified beneficiaries and prepared lists of selected farmers, as well as with the District Agricultural Committees (DACs), who approved the lists. However, in a survey of cooperative leaders, only 5% of them reported that previous support from the FSP was taken into account when selecting recipients – the most cited criteria for support was membership of the cooperative and ability to pay for the subsidised inputs. Also, the DACs do not appear to have checked the lists for graduating farmers, let alone enforced the rule.

4.2.7. Assessment

The ZFSP in Zambia is plagued by many of the same difficulties as the AISP in Malawi. The greater use of agricultural input appears to have substantial effects on maize production, but the extra output comes at a very high cost. The best estimates available suggest that it would be cheaper to import maize for consumption in urban areas than to increase production within Zambia through the ZFSP in its present form. Input subsidies could still be justified if the apparent inefficiencies were outweighed by equity considerations or a long term sustainable development of the input sector. However, such effects are doubtful as discussed below.

The most important barriers to greater efficiency of the ZFSP appear to be inappropriate targeting of beneficiaries and inefficient input delivery. The World Bank (2010) suggest that a large part of the beneficiaries already had reasonable access to agricultural inputs on commercial terms and around half of surveyed households purchased some inputs prior to benefiting from the ZFSP. This indicates a considerable risk that the subsidised input can displace input sales on commercial terms reducing the overall increase in input use and agricultural productivity. Further, despite efforts to involve the private sector in supplying and distributing the inputs through public tenders, the input delivery system appears highly non-competitive. Year after year fertilizer supply contracts are awarded the same 2-3 large firms, one of them a parastatal, indicating general lack of competition. Distribution and storage of the inputs is tendered out to private transporters and warehouses, but it is still centrally managed and not subject to much competition. In essence, the ZFSP creates a parallel state-controlled input marketing system, which competes with (on a subsidised basis) rather than utilizes the private market.

It is striking that although the ZFSP objectives target smallholders in general, they do not emphasise particularly the poorest and most vulnerable households. It appears that the programme was designed to target the less-poor smallholders, possibly based on a presumption that the poorest households may lack the capacity to fully utilise the subsidised inputs. The evidence we have suggests that this targeting objective is largely met, which also means that the programme fails to benefit the poorest and most vulnerable households directly.

It is very doubtful that the increased use of agricultural inputs and higher agricultural productivity achieved by the ZFSP is sustainable in the long run. Unlike the AISP in Malawi, the ZFSP does contain an exit strategy but it is largely ignored. Programme activities are not designed to address the underlying causes of the low agricultural input intensity, and in some cases they may actually make things worse. Major barriers to input adoption appear to be the lack of access to inputs in remote areas and, where they are available, high prices partly due to imperfect competition. Ideally, input subsidies will stimulate demand and induce more firms to establish shops in remote areas, thereby increase access to inputs and competition in the market. However, the FSP only stimulates demand for subsidised inputs, which are not supplied by the market. In fact, the programme risks reducing market demand through displacement. The World Bank (2010) found that 7% of beneficiaries, who purchased inputs from the private market before receiving subsidised inputs, stopped doing this after enrolling in the programme. If other recipients, who continued to buy commercial inputs, reduced their private sector demand, displacement could be higher. Unfortunately, we do not have more precise estimates of displacement.

Although the ZFSP encourages some private sector involvement through open tenders, the contracts are never awarded new or potential entrants with the justification that such new players lack the capacity to ensure timely delivery of inputs. However, if the programme only involves the few private firms that already have the capacity to deliver the inputs, it is very unlikely that it will contribute to the development of a more competitive private input supply sector.

In conclusion, the ZFSP has a significant effect on food production, but costs are too high. The main beneficiaries are not the poorest households – in fact the programme appears to be designed to specifically target the less-poor. And long term sustainability is threatened by a state-driven and non-competitive delivery system.

4.3. Ghana, Fertilizer Subsidy Programme (GFSP)⁶

4.3.1. Background

The fertilizer subsidies implemented in Ghana in 2008, later extended to 2009, were very different from the programmes implemented in Malawi and Zambia. It was never meant to be a comprehensive programme aimed at achieving a sustainable increase in smallholder adoption of agricultural inputs. Rather, it was designed in great haste as an emergency measure to mitigate the adverse impacts of the extremely high fertilizer prices.

The fertilizer market in Ghana was one of the most liberalised in SSA prior to 2008 with virtually no government intervention. The termination of universal subsidy programmes through the 80s and 90s coincided with a decline in fertilizer intensity from 22 kg/ha in 1978 to 8 kg/ha in 2006 (Yawson et al 2010). As fertilizer prices grew rapidly through 2007 and 2008, the government feared that fertilizer use would decline even further (by an estimated 70%), reducing agricultural productivity and food production (by potentially 20%), necessitating imports of food crops, the prices of which also reached an all-time high during this period. In March 2008, the government began discussing with leading importers the possibility of subsidising fertilizer to counter the rising prices, and in May it announced its intention to do so. However, it was not until early July that details of the programme were published. On 4 July 2008, the subsidy took effect, too late to benefit the major season in southern areas and the plantings in the northern regions, and barely in time for the second fertilizer application in the north and the minor season in the south.

⁶ This section is based on Banful (2009) unless otherwise noted.

It is part of the story that 2008 was an election year in Ghana. The incumbent New Patriotic Party (NPP) was seen as a party of the urban elite and stood in the polls to lose November's election to the National Democratic Congress (NDC), which garnered most of its support from the rural population. Banful (2010b) interprets the input subsidy programme as an attempt to show farmers that the government had empathy for the rural population. In the event, NPP lost the election by less than 0.01% of the votes. NDC took over the previous government's subsidy policies and continued the programme for another year.

4.3.2. Outcome

It is not possible to estimate the outcome of the GFSP to any reasonable degree of confidence. The programme was designed to avoid a decline in fertilizer use and agricultural production by keeping fertilizer prices constant, so we cannot assess the outcome by observing increases in output. Yawson et al (2010) report that the fall in food output avoided could be as much as 20%, but such estimates are highly uncertain. Even if we take this estimate as an indication, it is not possible to calculate the value of the programme as we do not know exactly which crops are the main beneficiaries of the subsidised fertilizers. Surveys suggest that the fertilizers are applied to a wide variety of crops, including maize, rice, vegetables (tomatoes, cabbage, etc.), fruits (oranges), and oil palm.

Data from Faostat show that total production of maize and rice increased substantially in 2008 and 2009, by respectively 21% and 10% (maize), and 58% and 30% (rice). These numbers should not be taken as outcome estimates, as a wide variety of factors unrelated to fertilizer subsidies (e.g. weather) may have affected production. However, they may serve as an indication that a massive decline in output due to higher fertilizer prices has been avoided. To what extent this may be attributed to the GFSP cannot be determined.

4.3.3. Scope

Compared to the input subsidy programmes implemented in Malawi and Zambia, the subsidies offered in Ghana constitute a very small scale programme. The total costs of the programme is estimated at around USD 14 million in 2008 and USD 26 million was set aside to cover the costs of an extension of the programme in 2009 (Yawson et al 2010), corresponding to roughly 0.05% and 0.1% of GDP respectively.

The size of the subsidy was set to keep the prices faced by farmers roughly the same as in 2007, around GHS 14 – GHS 28 (approximately the same amount in USD) per 50 kg bag of fertilizer, depending on the type of fertilizer and geographical location. This subsidy corresponded to around 50% of the total remunerations received by importers. Initially, the government planned to issue 600,000 vouchers in 2008, each redeemable for the specified rebate on one 50 kg bag of fertilizer, but in the end more than 1.1 million vouchers were printed, although less than 50% of those were eventually redeemed. The reasons for the overrun of the number of vouchers and subsequent low redemption rate are not entirely clear. However, it appears that lack of clear criteria for the distribution of vouchers and general uncertainty about how many vouchers were available in each district generated an initial shortage of vouchers during the critical late summer months where fertilizers are most effectively applied.⁷ This prompted the government to issue more vouchers, and the subsequent glut caused shortage of fertilizers. There were also reports of hoarding, in some cases even by farmers who had no intention or

⁷ Second fertilizer application in the northern regions and fertilizers for the second (minor) season in the Southern areas. Other peaks for fertilizer application in Ghana are during the spring and early summer, but at that point the subsidy was not yet in effect.

capacity to utilise the vouchers. We do not have detailed information on how many vouchers were distributed in 2009.

4.3.4. Targeting

The vouchers were allocated to District Agricultural Directors, who passed on the vouchers to extension officers for final distribution among farmers. The distribution of vouchers between districts was formally based on vague notions of “farmers’ need”. However, Banful (2010b) argues that the actual regional allocation of vouchers was more closely correlated with political factors than efficiency or equity considerations. Specifically, he shows that districts, which the incumbent party lost in the previous election in 2004, received more vouchers than districts it won. Further, the number of vouchers allocated to a district increases with the vote margin, with which the district was lost. Banful (2010b) interprets this result as attempts of “vote-buying” by the government. The weaker the government is in a district, the more it is favoured by the subsidy programme.

At the sub-district level, there were no centrally stipulated criteria for who were eligible for receiving vouchers, so any guidance was mainly provided by the district directors. Banful (2010b) does not have any results on village-level allocation, but he argues that the most important politics is conducted at the district level anyway. As a result of the limited guidance, targeting varied greatly from district to district in terms of the number of vouchers each household could have (from 2 to 10 or more) and any characteristics of beneficiaries. Generally, it seems that most extension officers handed out vouchers to farmers on a first-come first-served basis.

4.3.5. Delivery

The GFSP stands out as one of the most liberal fertiliser support programmes in SSA by extensively utilising the existing private sector for input supply, distribution and retailing. The vouchers could be used as partial payment for fertilizers at any retailer, who would accept them. The retailers would then pass the vouchers up through value chain to fertilizer importers, who would ultimately redeem vouchers with the government.

Such a market-oriented voucher system is potentially very efficient, as it allows farmers to choose freely between different suppliers spurring competition among existing businesses as well as new entrants. It reduces the need for the government to set up and manage parallel distribution systems and select suppliers and distributors through lengthy tender procedures. Also, there is less risk of hurting the existing private input supply sector through displacement of commercial input supplies, as these private suppliers are free to engage in the subsidised input trade.

However, in practise a number of factors served to diminish these benefits. Most importantly, only fertilizer importers were able to redeem vouchers for cash with the government. In effect, a relatively small number of importers acted as gatekeepers controlling the flow of fertilizers from the world market to Ghana as well as the flow of subsidies from the government to farmers, which bestowed considerable market power on importers. A consequence of this bias was that less than 40% of all retailers accepted vouchers from farmers, primarily because they were unable to redeem vouchers with their own suppliers or because it was too expensive or too difficult to do so (Krausova and Banful, 2010). Most retailers, particularly the smallest ones in the most remote areas, have no direct relationship with importers. Therefore, voucher would often have to travel through numerous steps in the supply chain, each step subtracting a margin from the voucher value, before reaching the government for final settlement (Banful, 2010a). Around half the retailers, who sold subsidised fertilizer, submitted their vouchers to another agricultural input dealer (Krausova and Banful, 2010).

There were other factors hampering programme effectiveness. Due to the late launch of the programme, the fertilizers arrived late in the season significantly reducing their effectiveness. Since the programme was announced in advance, many farmers had postponed input purchases in anticipation of subsidies. The distribution of vouchers was characterised by confusion and general lack of information regarding e.g. how many vouchers were distributed, how to get the vouchers and which retailers accepted them. The confusion was exacerbated by the fact that vouchers were specific to fertilizer type so a NPK 15:15:15 voucher could not be used to purchase urea. This led to a shortage of vouchers for preferred fertilizer types and many farmers had to settle for fertilizer they had little experience with. As a result, a large majority (92%) of households surveyed by Yawson et al (2010) were dissatisfied with the accessibility of subsidised fertilizer.

4.3.6. Exit strategy

The programme was designed and announced as an emergency response to high fertilizer prices in 2008 and therefore intended to expire by the end of that year. In the event, the subsidies were extended into 2009 as well, even though the crisis had subsided by then. We have found no indications that the programme has been extended further.

4.3.7. Assessment

It was never the intention of the GFSP to achieve a long term increase in fertiliser adoption by the poorest smallholders, so it is perhaps unfair to judge the programme on the basis of efficiency, equity and sustainability related to such objectives. It is, however, interesting to evaluate some of the main features of the programme by these criteria to provide insights into the performance of different design choices.

The background and design of the programme suggest that fertilizer importers have had a large influence on the government's subsidy policies. The idea of an input subsidy was first proposed by the largest fertilizer importer in September 2007, and the programme was designed through a series of discussions between the government and the largest importers. There is little doubt that importers are some of the main beneficiaries of the programme. Banful (2009) reports that the total prices (subsidy + farmer contribution) of fertilizer during the 2008 programme period (July – December) as negotiated by the government and importers were in most cases significantly higher than the market prices prevailing immediately prior to the launch of the programme (June 2008). For instance, in the Ashanti region NPK 15:15:15 and urea sold for GHS 35 in June whereas the negotiated prices for July-December were respectively GHS 50.50 and 51.50 (the extra margins on sulphate of ammonia were generally much lower). Not only did importers avoid a large reduction in sales, they also appear to have extracted a higher margin. By restricting final settlement of vouchers to relatively few large importers, the programme adds to the market power of importers and diminishes the efficiency gains achieved by implementing a highly market-oriented approach.

A major benefit of a voucher system is that the government can potentially target the most vulnerable and poorest smallholders and thereby promote a more equitable distribution of productive resources. Such possibilities have largely been ignored in this case, although a relatively wide geographical distribution was achieved by making vouchers region-specific thereby forcing suppliers to serve remoter and more costly areas. The choice of making extension officers responsible for final distribution of vouchers is praised by Yawson et al (2010), as a smart and innovative approach. Extension officers are supposed to be in close contact with farmers and know them reasonably well and they can complement fertilizer vouchers with knowledge and training. Also, they may be less inclined to using vouchers as an instrument for political patronage than, say, village chiefs because they cut across tribes or ethnic groups, regions, religions and political persuasions.

The long-term sustainability is less of a factor in this case, due to the programme's short term and narrow objectives. The subsidies are unlikely to have significantly increased fertilizer adoption relative to pre-GFSP periods, as the main effect was to keep prices constant. It is possible that the programme averted long term negative effects. If the fertilizers had not been subsidised, a large decline in demand could have caused struggling input suppliers to exit the market resulting in less competition and thinner geographical market coverage. It is, however, questionable whether the programme saved many suppliers as it mainly benefited importers and large (better connected) retailers, which are likely to be better equipped to withstand temporary shortfalls in demand. The long term outcomes of the programme are therefore expected to be limited.

In conclusion, the outcome of the GFSP is uncertain, and any effect is likely to be temporary. There was no attempt at targeting the poorest households, and particularly large fertilizer importers appear to have benefited greatly from the programme.

4.4. Tanzania, National Agricultural Input Voucher Scheme (NAIVS)⁸

4.4.1. Background

The National Agricultural Input Voucher Scheme in Tanzania (NAIVS) is a very new and still ongoing programme launched in 2009. Therefore, little evidence is presently available on the general performance of programme. We chose to include the case anyway, as a recent study (Pan and Christiaensen, 2011) on a pilot subsidy programme undertaken in 2008 offers detailed insights into the targeting performance of the voucher mechanism employed in the NAIVS. The following will therefore focus mostly on experiences gained from the pilot programme, but we will also comment on some of the features of the expanded NAIVS.

The pilot subsidy programme initiated in 2008 and later expanded into the NAIVS in 2009 was launched by the Government of Tanzania in response to the high food and fertilizer prices prevailing in 2007-2008. Agricultural input intensity is very low in Tanzania, farmers use on average 8 kg/ha of fertilizers (below SSA average), and only 5.7% of rice farmers and 0.7% of maize farmers use improved seed varieties together with fertilizers. Agricultural productivity is low by international standards and relative Tanzania's own potential as measure by research field tests and on-farm trials (World Bank, 2009). The government therefore argued that the best way to improve national food security in the face of high international food prices was to promote the use of agricultural inputs to raise productivity.

4.4.2. Outcome

It is still too early to assess the outcome of the NAIVS. We have not found any attempts in the literature to make even preliminary estimations.

4.4.3. Scope

The NAIVS is designed to reach a total of 2.5 million households (around 45% of all smallholders in Tanzania) in 65 districts, and subsidies are specifically targeted at producers of two major food staple crops, maize and rice. Each beneficiary household is entitled to an input package suited for the cultivation of ½ ha of maize or rice at a 50% subsidy.⁹ Thus, the input package is larger than the ones offered to Malawi farmers, but smaller than the Zambian equivalents. The subsidy is smaller than in

⁸ This section is based on Pan and Christiaensen (2011) and World Bank (2009) unless otherwise stated.

⁹ Specifically, 1) one bag of urea; 2) one bag of Di-ammonium Phosphates or two bags of Minjingu Rock Phosphate with nitrogen supplement; and 3) 10 kg of hybrid or OPV maize seeds or 16 kg of rice seeds.

both of these countries, and it appears to be fixed in percentage terms, implying that farmer contributions will vary in proportion to input prices. The programme is budgeted at USD 299 million over three years, of which USD 139 million is covered by the Government of Tanzania and the rest financed by the World Bank. This corresponds to around 0.4% of GDP in 2009.

4.4.4. Targeting

The programme establishes a chain of Voucher Committees at the Regional, District and Village levels to oversee allocation and distribution of vouchers. The vouchers are allocated specifically to high-potential maize and rice production regions and to areas where rice farmers have access to irrigation. The Village Voucher Committees (VVC) are six-member bodies (three women and three men) elected by village assemblies. The VVCs are responsible for selecting beneficiaries and prepare lists of recipients for approval by the village assemblies.

The pilot programme in 2008 stipulated very few, broad targeting criteria. VVCs were advised to target literate farming households willing to use the input vouchers for the purported crops and able to meet the farmers' co-financing. Such criteria mainly pointed towards the less poor households and left significant targeting powers at the discretion of the VVCs.

The study by Pan and Christiaensen (2011) sets out to estimate the targeting performance of the 2008 pilot programme relative to the programme's two overall objectives, 1) to increase overall maize and rice output, and 2) to increase access to modern inputs among poor and vulnerable smallholders. The first criterion is effectively an efficiency criterion as they estimate to which extent the pilot programme targets households, who are able to increase output the most. The second criterion relates to equality. The study is based on a household panel survey, which allows the authors to better control for factors unrelated to the pilot programme.

The study provides three striking results: Firstly, the estimated targeting performance is very close to what would prevail if vouchers were allocated randomly between intended (poor or productive) and unintended (less-poor or less-productive) targets. Targeting towards the most productive households is slightly better than random, but targeting in favour of the poor is slightly worse. Secondly, the authors find clear evidence of what they refer to as elite capture. Specifically, they estimate that elected village officials receive about 60% of the distributed vouchers, and other indicators of political connectedness, such as access to TV, radio and internet or participation in public meetings or farmer's associations, also significantly increases the likelihood of receiving vouchers. As the "political elite" tends to be less poor, this bias goes a long way to explain the poor targeting performance. Thirdly, the targeting performance relative to the poverty objective tends to improve with the number of vouchers available for distribution. This suggests that the bias in targeting resulting from elite capture can be reduced by ensuring a reasonable household coverage.

These results can be interpreted in the following way. That targeting on average is not too far from a random allocation, and 60% of all vouchers go to the elite, could indicate that the remaining vouchers were very well targeted. Perhaps the political connections of the elite provide a privileged access to vouchers. Once the demand of the elite is "saturated", the remaining vouchers go to the intended targets. Such an interpretation is also consistent with the finding that targeting performance increases with household coverage. Passing a certain threshold, the elite has already taken its share and the full increment in vouchers is allocated to intended targets.

Following the experiences gained by the pilot programme, the expanded NAIVS programme document defined the targeting criteria as:

1. Full time farmers residing in the village
2. Farmers cultivate less than one hectare of maize or rice
3. Farmers use the subsidised input of maize or rice production
4. Farmers agree to serve as good examples in how to use good agricultural practices
5. Farmers are willing and able to cover the co-financing
6. Female-headed households are given priority
7. Farmers, who have not used inputs in the past five years, are given priority

These criteria attempt to clarify the intended targeting, but inconsistencies still exist. For instance, some criteria focus on the most vulnerable smallholders (less than one ha of land and female-headed), whereas others effectively excludes the poorest households (ability to cover co-financing). Also, several criteria may be very difficult to document (no recent input use) or enforce (serve as a good example). Whether the redefinition and clarification of criteria improves targeting performance remains to be seen.

4.4.5. *Delivery*

Input supply, distribution and retail are largely undertaken by private sector actors. Farmers turn in vouchers for a rebate at specifically certified agro-dealers, who can redeem the vouchers directly with a branch of the National Microfinance Bank (NMB). Certification is open to any agro-dealer, who completes a business and management training programme organised by the Citizens Network for Foreign Affairs (CNFA), an NGO. The agro-dealers procure the inputs from the open market, which is reportedly rather competitive.

Due to the recent launch of the programme, we have found no evidence on the performance of the delivery system. Pan and Christiaensen (2011), who focus exclusively on targeting, do not discuss delivery.

4.4.6. *Exit strategy*

The programme plans for a duration of three years, and farmers are eligible for a maximum of three years of support. The beneficiaries of the pilot programme continue to receive vouchers under the expanded NAIVS, and new entrants are expected in each year of the programme duration. Therefore, additional government support is needed for two years after programme termination to complete the three-year cycle of late entrants.

4.4.7. *Assessment*

The experiences gained from the pilot input subsidy programme in Tanzania highlights the potential trade-off between objectives of raising national food production on the one hand and benefiting the poorest and most vulnerable households on the other – or in the economic terminology - between efficiency and equity. The farmers, who are most capable of translating an increase in agricultural input use into expanded output, are not necessarily the poorest farmers. Indeed, Pan and Christiaensen (2010) suggest that targeting the poorest households has a lower impact on crop production than benefiting the less poor.

These findings suggest that it may be necessary to decide whether the primary objective of the input subsidy programme is pro-poor growth or improved national agricultural production. The dual objectives of the TFSP risks worsening the targeting performance and reducing the chance to meet any of the objectives.

Under the NAIVS, locally elected VVCs are responsible for selecting beneficiaries, and the list of recipients must be approved by the village assemblies. This design choice is made to enhance transparency and accountability. However, it also places significant power with the local political elite, which may divert programme benefits away from intended targets and thereby reduce programme performance in terms of both efficiency and equity. Pan and Christiaensen (2010) found that targeting performance may be improved by ensuring a relatively high household coverage. However, such a strategy implies a tacit acceptance of the fact that some programme benefits will be captured by unintended targets.

Due to the recent launch of the programme, we have little evidence, on which we can evaluate programme sustainability. However, a few observations on programme design can be made. Of the four input subsidy programmes investigated in this evaluation study, the delivery system of NAIVS is perhaps the one that is most in line with the market-based approach characterising an ideal smart subsidy programme. It is designed to interfere very little in the existing private market, and in contrast with the GFSP in Ghana, it places the voucher settlement with an actor outside the input supply value chain (the NMB) thereby dispersing some of the market power. This may be sufficient to avoid significant distortion of the private market. On the other hand, it also presumes that a reasonably competitive private market already exists, and it is not clear how inputs may be delivered to more remote areas, where the private sector may be less developed. Apart from the market oriented approach, there is little to suggest that the programme to any large extent addresses the potential underlying barriers to widespread input adoption, such as credit constraints, risk of crop failure, etc. It is therefore questionable whether any rise in the use of agricultural inputs will persist after termination of the programme.

In conclusion, the NAIVS in Tanzania represents an example of a highly market oriented input subsidy programme. Significant resources are diverted to benefiting the less-poor with good political connections. We have no information on the short term outcomes of the programme, and there is little to suggest that outcomes will be sustainable in the long term.

5. Lessons Learned

The assessment of the four cases above illustrates the complexity of subsidising agricultural inputs and highlights some of the challenges that must be addressed to ensure that a subsidy programme enhances efficiency, equity and long term sustainability of agricultural input use. This section will summarise some of the main lessons learned from the four cases and where the most important gaps are in the current state of knowledge.

5.1. Background

What have we learned?

- Most of the programmes reviewed here were implemented in response to adverse shocks to agricultural markets. The AISP in Malawi was launched after a severe drought and poor harvests in 2004/5, and the programmes in Ghana and Tanzania were implemented in response to high fertilizer prices in 2008. This suggests that the political motivation behind the programmes was a desire to signal leadership and decisiveness in response to an emergency. Efficiency, equity and sustainability may have been secondary objectives at best.

5.2. Outcome

What have we learned?

- Significant increases in agricultural productivity and food production is possible, and the potential for improving agricultural productivity by subsidising agricultural inputs exists. However the estimates are somewhat uncertain. Costs are very high, and given uncertainties it is unclear whether the programmes provide value for money.
- There is very little convincing evidence to suggest that outcomes are likely to persist after termination of the programmes. However, the subsidy programmes are designed to address the distortions created by market imperfections rather than the market imperfections themselves. When (if) the programmes are phased out, input use is likely to decline again.

What do we need to know?

- It is very difficult to judge if input subsidy programmes are a good investment given the information available at this point. In particular, more precise estimates are needed of impacts, as well as opportunity costs in terms of returns on alternative investments foregone. Also, estimates of dynamic (long term) impacts are virtually non-existent, so there is little evidence upon which to evaluate the long term sustainability of the programmes.
- More knowledge is needed on how to promote sustainability of a subsidy programme. A more sustainable programme would focus more on alleviating the market failures, which distorts agricultural markets, and less on mitigating the effects of the distortions.

5.3. Scope

What have we learned?

- Subsidy design involves trade-offs between efficiency, equity and sustainability. If the subsidy varies with input prices (as in the programmes in Malawi and Zambia), poor farmers are partly or completely shielded from high prices, but economic returns from the programme becomes more variable and likely negative when input prices are high. Also, high input prices risk financial sustainability of the programme. On the other hand, if the subsidy is fixed in percentage terms (as in Ghana and Tanzania), farmers share a part of the burden of higher input prices, which could exclude the poorest farmers and cause disruptions in the functioning of input markets.
- The nature and scope of the subsidy is closely related to targeting performance. Greater household coverage improves targeting performance, as demonstrated in Tanzania. The size of the subsidy determines how easy it is for the poor to meet co-financing requirements. Larger input packages make the subsidy less relevant for poor farmers (as exemplified in Zambia). Finally, a relatively large scale programme is needed to achieve a reasonable effect on national food security and food prices.

What do we need to know?

- More knowledge is needed on the consequences of input price volatility for programme performance and, particularly, long term sustainability. Does an input price spike, like the one observed in 2007-2008 simply lead to a temporary decline in demand and agricultural

productivity, or does it have more serious long term repercussions for smallholder adoption of agricultural inputs, private input markets, credit constraints, etc.?

5.4. Targeting

What have we learned?

- None of the four programmes examined here succeed at targeting the poorest and most vulnerable households. Indeed, some of the programmes did not intend to. A voucher scheme has a potential for targeting subsidies at specific groups of farmers, poor and vulnerable households, farmers who do not already use inputs, most productive farmers, etc. However, realising the potential is very difficult.
- The institutions with the responsibility for selecting beneficiaries have considerable discretion over subsidy allocation, which generates the potential for favouritism, corruption and political patronage. There is considerable scope for clarifying and focusing the targeting criteria in all four programmes, but the question remains whether and how such targeting criteria can be enforced.

What do we need to know?

- How are targeting mechanisms best designed to avoid or minimise targeting bias? Is a certain degree of favouritism a necessary cost for a reasonably well targeted subsidy? Is such a cost acceptable?

5.5. Delivery

What have we learned?

- Smart subsidy programmes seek to promote the development of a competitive private input distribution network to enhance efficiency and long term sustainability. Yet some programmes employ large existing firms, to the effective exclusion of new smaller entrants, precisely because the large firms already have reasonably well developed distribution networks. The desire to ensure effective delivery of inputs to farmers risks undermining the development of a competitive private delivery system.
- There is a trade-off between efficiency and (regional) equity in input delivery. Efficiency can be enhanced by utilizing existing private input supply sector (provided the private sector is reasonably competitive), but this may come at the cost of regional coverage, by effectively excluding remote areas where markets are thin and private agro-dealers largely absent. Is it possible to complement the private sector in dense areas with state-managed supply in remote areas? Or can a subsidy programme induce the private sector to expand into remote areas?
- Most of the programmes experienced serious delays and uncertainty in the delivery of inputs to farmers, mainly due to administrative challenges. Such delays may have severe consequences for programme efficiency and sustainability. Postponing application of inputs diminishes yields directly, and uncertainties about input subsidy entitlements may cause farmers to reduce commercial purchases.

What do we need to know?

- Apart from the timing issues, we have encountered little evidence on the actual performance of the input delivery system (with the possible exception of Ghana). For instance how competitive is the private input supply sector (what are the costs of market power?), how well developed are the input markets in remote areas and how efficient are alternative state-controlled distribution channels?

5.6. Exit Strategy

What have we learned?

- Exit strategies are largely absent, non-credible or never enforced in the Malawi and Zambia programmes. In Ghana the exit strategy was implicit in the single-year scope (expanded to two) of the programme. In Tanzania, the exit strategy has not yet been tested. Exit strategies are based on the premise that positive effects of the programme persists after programme termination. There is very little convincing evidence to suggest that this is likely to happen.
- Absence of a clear programme duration can lead to poor programme performance by increasing uncertainty about future entitlements and preventing the continuous flow of funding and inputs. If programme continuation and scope has to be decided each fiscal year, the structure of the public budget-cycle may cause delays in the final delivery of inputs (as demonstrated by the ZFSP in Zambia).

What do we need to know?

- More knowledge is needed on how to make an exit strategy effective and credible. Subsidy programmes are often popular and there is considerable political pressure for their continuation and expansion. How can such pressures be countered to improve chances of long term sustainability?

6. Conclusion

Based on the findings presented in this evaluation study, we conclude that agricultural input subsidies are not likely to be an appropriate use of scarce fiscal resources, if subsidy programmes are designed and implemented in ways similar to the four programmes studied here. It is true that input subsidies appear to raise agricultural productivity substantially. The programmes in Malawi and Zambia have shown impressive effects on national food production. However, the so-called smart subsidy programmes considered in this study are still plagued by many of the same problems associated with the earlier generation of universal input subsidy programmes. Programme performance could potentially be improved by addressing the issues outlined below, but the challenges are huge.

First, the programmes are too costly and inefficient. They fail to properly utilise the efficiencies offered by the private input markets by channelling resources through parastatal entities (Malawi), state-managed distribution networks (Zambia), or large non-competitive corporations (Malawi, Zambia and Ghana).¹⁰ Other factors have reduced the effectiveness of input subsidies: Poor targeting have resulted in displacement of non-subsidised private sector sales, limiting the total expansion in the use of agricultural inputs. And administrative problems have led to significant delays, generating uncertainty

¹⁰ Input delivery in Tanzania may be more competitive, but we do not yet have sufficient information on the delivery performance of the NAIVS.

about entitlements and postponing the application of inputs. Additionally, the sheer size of the programmes, particularly in Malawi and Zambia, significantly limits the resources available for other investments and threatens the sustainability of government finances.

Second, most programme benefits accrue to less-poor and politically well-connected households as well as large input suppliers. In some cases (Malawi and Tanzania), priority is officially given to the poorest and most vulnerable households. In practise, they are largely excluded due to relatively high co-financing requirements (Ghana and Tanzania), input package size (Zambia), and conflicting or vague targeting criteria (Malawi and Tanzania). The institutions responsible for beneficiary selection (local councils, cooperatives and extension officers) enjoy considerable discretion over who will receive the subsidised inputs, and this authority provides opportunities for rent seeking and political manipulation. Large input suppliers are some of the main beneficiaries of the programmes as they face guaranteed demand at often inflated prices, and as they in some cases are bestowed special privileges (Malawi, Zambia and Ghana).

Third, the subsidy programmes mainly attack the symptoms of low input use and poor agricultural productivity rather than the underlying “disease” of high input procurement costs and market failures. Long term sustainability of the programmes is therefore doubtful. It is possible that a truly market oriented programme may strengthen the competitiveness of the agricultural input markets, but if input demand collapses after termination of the programme such gains may disappear. The greater use of agricultural inputs may persist if smallholders manage to accumulate enough assets to overcome credit constraints and become less vulnerable to crop failure. There are, however, no signs of this happening.

Fourth, there is a substantial risk that an exit strategy will be ineffective (as demonstrated by Malawi and Zambia). Once an input subsidy programme is launched, most stakeholders have a great interest in its continuation and expansion. Recipients benefit directly, the local elite may use subsidies as a tool to reach political objectives, input suppliers enjoy a stable demand and possibly greater market power, and national policy makers may point towards tangible results of their policies in terms of higher agricultural output. Likely consequences are that the programme becomes more entrenched in the political system and more subject to political manipulation and rent seeking.

It may be possible to improve efficiency, equity and sustainability of the input subsidy programmes, but the challenges are huge. A voucher scheme is potentially an effective instrument for disconnecting input delivery from subsidy targeting, thereby allowing the private sector to handle input delivery while the state organises targeting. The programmes in Tanzania and Ghana demonstrate that such a division of labour between the state and the private sector is possible. But they also show that institutional details, such as who has the power to redeem vouchers with the government, greatly affect programme performance. A more efficient or pro-poor targeting may be difficult to achieve. No matter how clearly target criteria are specified, they need to be enforced to be effective. Most likely, those who identify beneficiaries will always have some discretionary power which can be exploited. As input subsidies are unlikely to alleviate market failures directly, long term sustainability of programme impacts largely depends on recipients’ ability to accumulate financial assets from production surpluses generated by the subsidies. We have seen no evidence of this happening.

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