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The Evaluation of the 2008/09 Malawi Agricultural Input Subsidy Programme: Lessons from Impacts

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Background

The objectives of the 2008/9 Malawi Agricultural Input Subsidy Programme (MAISP, now termed the Farm Input Subsidy Programme, FISP), were to improve national and household food security and self sufficiency and incomes through increased food and cash crop production and productivity, by improving accessibility and affordability of agricultural inputs among the most vulnerable farmers.

Figure 1 sets out the potential positive impacts of a large scale agricultural inputs subsidy programme. In 2008/9, 65% of Malawian rural households received one or more fertiliser coupons. Such a large programme not only directly affects coupon recipients and input suppliers, it also affects crop and labour markets and indirectly affects the macro-economy and the livelihoods, activities and welfare of others in the country through these and other markets.

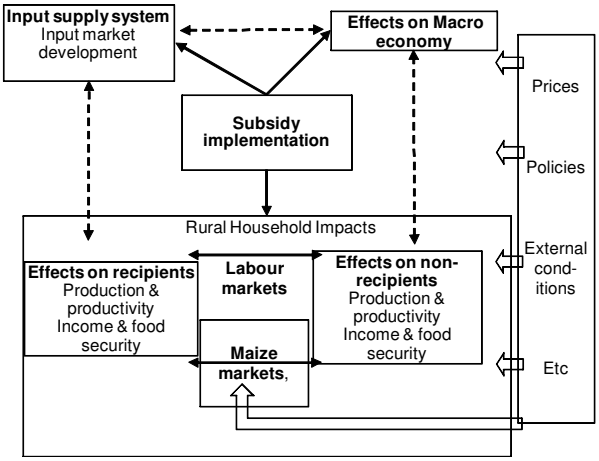


Figure 1. Potential impacts of a large scale agricultural inputs subsidy programme

Production impacts

The core of the programme is the transfer to selected rural households of a voucher which will benefit them either by enabling increased use of fertiliser, seed or pesticides or by effectively giving them a cash transfer if they sell the voucher or use it to buy inputs they would have bought anyway. If the voucher leads to increased input use it should lead to increased agricultural land and labour productivity and crop production.

Critical components of estimating incremental production from the MAISP are an understanding of (a) yield increments obtained from the use of inputs and (b) the incremental use of fertilisers and seeds as a result of the programme.

There are major difficulties in obtaining consistent and unbiased estimates of smallholder crop areas and yields in Malawi. Maize production and area estimates were obtained by asking farmers about their plot areas and production in a large scale nationally representative survey, and for some households yields in small demarcated sub-plots were also measured by enumerators or farmers, with rough measurement of the areas of the plots in which the subplots were situated. Consequent yield, area and production estimates from these different methods were compared with previous surveys where possible, with MoAFS estimates, and with budgets for national maize production and consumption. Significant inconsistencies were found across maize yields, areas and production in different reports based on different methods and sources, with different sources of bias affecting different methods. Estimates of maize yield responses to nitrogen were also affected by problems of multi-collinearity.

In analysis of these figures it has become clear that current widely used methods that rely on farmer reported yields and areas lead to over estimation of crop areas and under-estimation of yields. It is also clear that responses to input use are highly variable and depend upon both crop varieties (hybrid maize showing a substantially greater yield response) and to the conditions and management affecting individual maize plots (for example time of planning and weeding, number of weedings, and rainfall distribution) . Yields and programme benefits are thus amenable to significant increases from wider adoption of improved management practices such as greater complementary use of improved seed and inorganic and organic fertilisers, more timely and frequent weeding, higher plant populations, and earlier planting.

Despite considerable efforts attempting to reconcile different results from different methods, it has not been possible to come up with a single set of consistent unbiased estimates of national maize yields, areas, and production, or of precise impacts of the programme on these. Instead, as in the 2006/7 evaluation report, information from a large number of secondary sources is used to provide an estimate of maize yield response to nitrogen, using 18kg grain per kg N for hybrid maize varieties and 12kg grain per kg N for local maize varieties.

Table 1 presents estimates of incremental maize production using these yield responses to inorganic fertiliser (nitrogen) and improved (hybrid) seed, with high and low response scenarios 20% above and below.

Table 1. Incremental Production Estimates with Low, Medium & High Fertiliser Response ('000 MT)

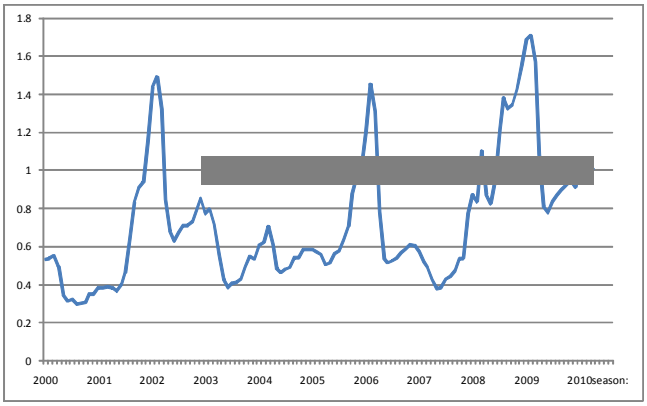
	Low	Medium	High
Displacement		5%	
Local	375	469	563
Composite	34	43	52
Hybrid	405	506	608
Total	815	1,018	1,222
Displacement		15%	
Local	336	420	504
Composite	32	39	47
Hybrid	368	460	552
Total	736	920	1,104

A total of approximately 200,000MT of subsidised fertiliser were disbursed by the programme. It is estimated from survey data that up to approximately 10% of this was not used by smallholders but was bought and used by others (for example estate farmers or urban people). Very high commercial fertiliser prices and some improvements in targeting led to a dramatic fall in displacement of unsubsidised fertiliser sales. Thus it is likely that around 90% of the 200,000MT subsidy sales led to incremental use of fertilisers, and consequently, as shown in table 1, to an increase in production of between 0.74 and 1.22 million MT of maize (the overwhelming reported use of subsidised fertiliser was on maize). Relatively stable maize prices across the year, without any spike before the 2010 harvest, is evidence of substantial quantities of maize across the country, although prices remained relatively high in real terms (compared for example with prices following the 2005/6 subsidy programme).

Maize market impacts

A major expected benefit from the programme should be low domestic maize prices, but this has not occurred, except in the 2006/7 marketing season, following the first (2005/6) subsidy year. The continuing relatively high price of maize has undermined the achievement of some of the potential wider food security and growth benefits of the programme over the last few years, as discussed later. Figure 2 shows how low and stable prices in 2006/7 (after the 2005/6 subsidy) were followed by high and highly variable prices in subsequent years, with government market interventions not being able to stabilise prices below import parity prices (represented approximately by the shaded band). Increased production would be expected to bring prices down, although prices in 2007/8 were affected by exports of over 300,000MT.Stable prices in 2009/10 are evidence of good supplies following the 2008/9 subsidy season, although the relatively high real prices are difficult to explain.

Figure 2: Monthly Maize Prices (1990 MK/kg)



Source: Compiled from MoAFS / FEWSNet data

Input Supply Systems

Effects on the input supply sector have been mixed, with stimulation of private sector fertiliser imports and, most importantly, of private sector maize seed supply and distribution. After useful progress in working with private sector fertiliser distributors, their exclusion in 2008/9 had a damaging effect on the development of private sector fertiliser distribution. There are arguments for re-evaluating the decision to exclude the private sector from retail distribution of subsidized fertilizer and re-establishing dialog/partnership between the public and private sectors. There is a need to explore systems that could allow private sector involvement in subsidy distribution in ways that will both improve smallholder access to imports from a wider number of suppliers while addressing government concerns about difficulties in controlling budgeted sales and possible coupon diversion to other uses.

Economic cost benefit analysis

Economic cost benefit analysis provides a fairly narrow means of comparing the benefits and costs of the programme, where benefits are measured in terms of the value of incremental production.

As noted earlier, we estimate total incremental maize production from the programme as lying between 0.74 and 1.22 million MT, around 50% of total production expected without the programme. Maize prices over the 2009/10 marketing season averaged around 40MK/kg, but in as far as some of the incremental production from the programme will have displaced imports and kept domestic prices down towards the end of the 2009/10 marketing season, the maize produced by the programme should be valued somewhere between import parity price and domestic market prices, suggesting a value of around $285 /MT. Table 2 (a) sets out alternative estimates of the ratio of benefits to costs for the 2008/9 programme under the incremental production scenarios discussed earlier but with 10% displacement. Since 2008/9 was unusual for very high fertiliser prices, Table 2(b) presents estimates with fertiliser prices reduced by 50% and with some lower maize prices to represent a range of more likely future market conditions.

Table 2(a) Economic Analysis 2008/9 prices

Maize price US$/MT		Scenario		
		Low	Medium	High
270	BCR	0.722	0.865	0.997
	NPV	-80.55	-40.81	-1.07
	FE	na	na	Na
280	BCR	0.749	0.897	1.033
	NPV	-72.65	-31.16	10.33
	FE	na	na	4.2%
290	BCR	0.776	0.929	1.069
	NPV	-64.76	-21.51	21.73
	FE	na	na	8.8%
300	BCR	0.804	0.961	1.105
	NPV	-56.86	-11.86	33.13
	FE	na	na	na

BCR: benefit cost ratio, FE: Fiscal Efficiency, NPV in million US$.

As found in the 2006/7 evaluation, estimated programme benefits and efficiency are highly sensitive to maize prices, yield responses and fertiliser prices. Reducing fertiliser displacement, increasing yield responses, and keeping fertiliser prices (and other costs) down are critical for raising returns to the programme. With low fertiliser responses the BCR is only greater than one with low fertiliser prices and high maize prices. However as discussed below, the BCR overlooks important growth and welfare benefits of the programme: these also need to be considered when evaluating programme benefits. It should be noted that increasing the scale of the programme is likely to lead to lower net returns by (a) depressing yield responses to fertiliser use, (b) increasing displacement, and (c) increasing the marginal opportunity costs of investment in the programme.

Table 2(b) Economic Analysis, reduced prices

Maize price US$/MT		Scenario		
		Low	Medium	High
150	BCR	0.649	0.767	0.873
	NPV	-62.78	-44.07	-25.35
	FE	na	na	na
200	BCR	0.869	1.022	1.158
	NPV	-23.30	4.17	31.65
	FE	na	3.4%	25.7%
250	BCR	1.091	1.276	1.439
	NPV	16.18	52.41	88.65
	FE	13.1%	42.6%	72.0%
300	BCR	1.315	1.530	1.717
	NPV	55.66	100.65	145.65
	FE	45.2%	81.7%	118.2%

Macro-economic impacts

The macroeconomic economic environment has remained broadly stable despite unexpected high prices and costs for fertiliser. With the subsidy contributing to increased government deficit spending in the 2008/09 fiscal year, the subsidy accounting for 60% of the MoAFS budget, and MoFA having the largest budget among the ministries, there have been major concerns about its fiscal and macro-economic sustainability of the programme. With dramatic falls in fertiliser prices in late 2008 and new limitations on the scope of the 2009/10 programme, these fears have now eased to some extent. However foreign exchange continues to be in short supply and there has been some increase in inflation in 2009 due to high fuel and maize prices.

Food security and welfare impacts

The 2008/9 programme appears to have led to most households having improved perceptions of their food security situation in the month immediately following the 2009 harvest, as compared with their perceptions at the same time of year in 2007. There were slightly more households dissatisfied with their food security situation in the 12 previous months, consistent with the high food prices experienced during 2008/9.

Econometric analysis of household responses over three years (2004/5, 2006/7 and 2008/9) suggests that subsidised input recipients perceive a food security benefit from the programme that extends beyond the year immediately following subsidised input receipt.

A variety of patterns of changes in welfare and wellbeing are found as regards perceptions of poverty ranking (which have generally improved), and perceived satisfaction with life, which appears to benefit in the short term in the season when subsidised inputs are received, but not improve more permanently.

A number of other impacts were mentioned during interviews, including reduction of begging and of the need to work off farm for low wages to meet short term food needs; higher school enrolments; reduced malnutrition; reduced theft and increased grain storage; improved social relations; and increased investments in houses and businesses. Although there is no evidence linking these claims to specific outcomes of the subsidy programme, there is evidence for declining poverty rates and malnutrition rates since the programme began in 2005/6, with the poverty headcount falling from 50% in 2005/6 to 40% in 2007/8, under 5s wasting falling from 6.8 to 5.8%, and average meals per day rising from 2.0 to 2.3.

Very significant increases in maize prices from 2007 to early 2009 were noted earlier. Ganyu wage rates also rose over the same period in nominal terms and kept abreast with or just kept ahead of maize price increases over the period from 2005/6 to 2008/9. Although high maize prices raise the programme's economic benefit: cost ratio, BCR analysis largely ignores costs to poor consumers of these prices. High domestic prices also depress real growth, poverty reduction and household food security. Investigation of this with indicative modelling of beneficiaries' and non-beneficiaries' livelihoods and of labour markets suggests that poor beneficiary households may nevertheless have had real income increases of 10% to 100% over the no-subsidy counterfactual situation in different years. Poor non-beneficiary households may also have had real income increases of between 0% and 20%, with gains varying between areas, between households with different savings behaviour, and between years with different subsidy rates and maize and labour market conditions.

This analysis captures part of a very important benefit of the programme that is not captured by the economic benefit-cost analysis – the way that incremental input use should raise the productivity of very significant amounts of Malawian labour and land otherwise engaged in low productivity maize cultivation. With time this should spill-over to other parts of the economy, if households can be sure they can purchase maize reliably and cheaply from the market, without relying on their own cultivation for food security.

It is not possible to quantify other potential impacts of the programme in both replenishing soil fertility and reducing extended cultivation onto more marginal slopes and soils and into forested land. The importance of such benefits should, however, be taken into account in the design and implementation of the programme and complementary activities and investments.

Costs, crowding out and other negative impacts

This paper has focussed mainly on the considerable positive impacts of the programme. It is important, however, to recognise that these are achieved at considerable cost. As noted earlier, the financial costs of the 2008/9 programme took up a very considerable part of the government budget. Total recorded financial costs of the programme to the government and donors amounted to nearly MK40 billion before recovery of farmer redemption payments, nearly MK34 billion after their recovery. These costs do not allow for a range of other costs incurred by government agencies and their staff involved in implementing the programme, and the lost productivity of these staff who would otherwise be engaged in other productive activities. Some of these costs, and costs of farmers accessing and using inputs, were allowed for in the total estimated costs used in the economic benefit cost analysis. Some of the activities that are crowded out by the MAISP (such as agricultural research and extension) may provide high if not so immediate returns on investment. The funds used in the programme may also prevent investments in roads, schools or health facilities and services, for example.

To maximise programme benefits it is important that the scale and costs of the programme are tightly controlled to minimise these crowding out effects, and that the resources invested in the programme do yield significant and rapid returns to the country, greater than could be achieved by their investment elsewhere. An important element of this involves ensuring that investments reach the intended beneficiaries and are coordinated with complementary policies and investments that can improve its effectiveness and efficiency, for example by investing in or encouraging rural roads, agricultural research and extension, and the development of efficient, effective and reliable private sector seed and fertiliser supply and distribution systems.

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